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ORIGINAL LECTURES.

ON ALIMENTARY RATIONS.[1]

A Lecture on Hygienic Therapeutics.

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GENTLEMEN: We have now passed in review in successive lectures the primordial alimentary principles, complete aliments, complex aliments, and beverages. It now remains for us to coördinate these elements, and establish the basis of dietetics.

Man, as I have told you, loses by the operations of nutrition, nitrogen, carbon, salts, and water. In the course of the twenty-four hours, these expenditures amount to 20 grammes of nitrogen, of which 14.5 grammes pass off in the urine under the form of urea and uric acid, and 5.5 grammes represent the nitrogen contained in the excrements, sweat, and mucus.

As for carbon, the daily waste is 310 grammes; of which, 250 are excreted by the lungs, 45 are eliminated by the kidneys, and 15 by the other excretions.

The salts are represented by a daily loss of 30 grammes. Lastly, we lose every day by the perspiration, by the pulmonary exhalations, by the urine and fecal matters, three litres of water.

Man must find in his food the elements needed to repair these incessant wastes. When these elements are furnished in insufficient quantity, nutrition suffers, there is commencing inanition; when the diet is too abundant, other troubles appear in the economy, of manifold nature, as we shall see. But there may be many variations in the amounts of these daily losses; age and sex, for instance, modify the quantity of carbon and nitrogen excreted, and this is due largely to the fact that the diet of infancy, mature life, and old age, cannot be precisely the same. This subject of alimentary regimen, and the data on which it is established, is one of exceeding interest, and in order satisfactorily to study it, we need to inform ourselves about what has been accomplished by zoötechnics.

Regarded from the limited standpoint of his alimentation, man is an animal, and all the laws which regulate the daily diet, the work, and the fattening of animals are in part applicable to man. I am, for my part, astonished that medical writers who have occupied themselves with this subject of alimentary hygiene have not drawn more largely from the numerous works which this important topic of the alimentation of domestic animals has produced.

Having been myself a pupil of the Zoötechnic Institute at Versailles, I am glad to be able to-day to turn to account the instructions which I have received from this school.

As has been shown by the masters of modern zoötechnics, one may at will develop in our domestic animals muscle, fat, and bone; one may even so modify the external constitution of animals as to create new varieties and even new species, which are to-day types of the domestic animals, varying according to the usage to which they are put. We ought then to have recourse to these same methods when we desire to establish a rational system of dietetics for man, and you will see me continually fortifying my position by facts drawn from zoötechnics.

The adult man, as I have said, when subjected to moderate labor, loses daily 20 grammes of nitrogen and 300 grammes of carbon; these 20 grammes of nitrogen represent 124 grammes of dried proteid matters. As these proteinaceous or azotized substances contain 64 grammes of carbon, deducting these 64 grammes from the 300 grammes necessary for nutrition, there remain 236 grammes of carbon, which must be furnished by amylaceous matters and by fats.

Moleschott, who has bestowed much study on the subject of alimentation, thinks that there is always a constant relation between the azotized matters, carbohydrates, and fatty matters, and he thinks that the relation between the proteid principles and the carbohydrates is as 1 to 3.47; and to the fatty matters, as 1 to 0.45. These different relations between the nitrogenous principles and carbohydrates on the one hand, and fats on the other, constitute what is called in zoötechnics *the nutritive relation of aliments*. These relations are represented by the following formulæ:

$$\frac{ma}{mna}, \text{ or } ma : mna.$$

$$\frac{ma}{mg}, \text{ or } ma : mg.$$

In these formulæ ma stands for the azotized matters, mna for the carbohydrates, and mg for the fats.

A diet based on these relations ought to consist daily of 124 grammes of proteid matters, 430 grammes of starch or other carbohydrates, and 54 grammes of fat for an adult man; this corresponds to the following *mixed ration* of bread and meat.

	Weight.	Azotized matters.	Starch.	Fat.
	grms.	grms.	grms.	grms.
White bread	819	61.83	435	48.20
Meat	259	62.17	.....	5.80
	1078	124.00	435	54.00

If from the domain of theory we pass to that of practice—*i. e.*, to the dietary of the adult man, as carried out on a large scale—we may take as type the daily fare of the soldier.

In a recent study of the highest interest made by Kirn,[1] this question has been studied in all its aspects. We there see that to-day, according to the latest official regu-

[1] Translated, from advance sheets, by E. P. Hurd, M.D., of Newburyport, Mass.

[1] Kirn: On the Diet of the Soldier. (Journal des Sciences Militaires, October, 1884.)

lations which went into effect July 1, 1873, the daily ration of the French soldier in times of peace is established on the following basis:

	Quantity. grms.	Nitrogen. grms.	Carbon. grms.	Fat. grms.
Bread	1000	12.00	300.0	15.0
Meat (with bones)	300	5.41	19.8	3.6
Fresh vegetables	100	0.24	5.6	0.1
Dry legumes (beans, peas, etc.)	30	1.02	12.6	0.6
Total	1430	18.67	338.0	19.3

This ration is superior to that of the soldiers of other countries, as may be seen by the following table:

DAILY RATION OF DIFFERENT ARMIES.

	Nitrogen. grms.	Carbon. grms.	Fat. grms.
French Army	18.607	338.0	19.30
Austro-Hungarian	17.00	363.9	38.80
English	17.39	382.1	39.10
Italian	17.47	363.3	17.42
German	18.02	283.9	16.42

But there is a point which should particularly interest hospital physicians, namely, hospital diet. In the full dietary regimen of hospitals the quantity of meat should never be less than 300 grammes (10 ounces) a day. Here I agree fully with Regnard, Inspector of Hospitals, who shows that a great many of these eleemosynary institutions of the departments furnish an alimentary regimen which is quite insufficient, in some instances not attaining the figure of 120 grammes of meat a day for each individual in average health. In these cases the high mortality of these hospitals must be attributed in great part to the bad aëration and meagre alimentation. We have seen in fact this mortality vary from 3 to 31 per cent., according to the statistics of Regnard,[1] and this enormous difference is sufficiently explained by the bad hygienic and alimentary conditions observed in certain of our hospitals and infirmaries.

Therefore, when you are called upon to direct or superintend these charitable institutions, you should insist not only that this quantity of 300 grammes of meat per day shall be supplied to each inmate, but also that the relation between the amylaceous and fatty aliments shall correspond as nearly as possible to the proportions which I have given above.

But we have been thus far occupied only with the daily fare of a man at rest, and such as is necessary to prevent bodily wasting. Multiple conditions present themselves which augment the phenomena of combustion, and hence necessitate an increase in the daily rations. One of the most active factors in bringing about this augmentation of the combustions is work.

In order to judge of this increased activity of the combustions of the economy, we may make use of three modes of investigation: the analysis of the gases of respiration (*i.e.*, the determination of the quantity of oxygen consumed, and of carbonic acid exhaled), the study of the temperature of the body by finding the rise or fall of the animal heat; lastly, by examination of the urine, and ascertaining the quantity of nitrogen daily excreted. The last two methods are the ones which we find the most available in clinical practice, and it is on them that I shall rely in endeavoring to show you the influence of work in augmenting the combustion of the economy.

Lavoisier was one of the first to show that muscular labor increases the quantity of oxygen consumed, and while a man at rest utilizes 36.6 litres of oxygen per hour, he requires in that time 91.25 litres in order to raise in fifteen minutes a weight 7.54 kilogrammes to 211 metres of height.

As for the quantity of urea, it also follows an ascending progression, and there is nothing more interesting in this regard than the figures furnished by Ritter, which are summed up in the following table:

INFLUENCE OF WORK ON THE EXCRETION OF UREA.

	Quantity of urine. grms.	Total of nitrogen. grms.	Ammonia. grms.	Urea. grms.	Uric acid. grms.
Rest	1340	17.89	0.48	32.90	0.90
A walk of 4 hours	1940	20.00	0.62	39.25	0.88
A march of 4 days	2120	20.30	0.59	40.30	0.62

I call your attention especially to the last two columns; you will there see that the proportions of urea and uric acid maintain an inverse relation, and that while during rest you observe a urea production of 32.90 grammes, and a uric acid production of 0.90 gramme, after four days' marching the proportion had risen to 40.30 of urea, while the uric acid had fallen to 0.62. The physical exercise had here produced a double effect: increased elimination of nitrogen, and increased oxidation of albuminoid matters; because, as you know, the uric acid represents an incomplete combustion of proteid elements. You should always have these facts before your eyes when you have to combat the symptoms which result from the accumulation of uric acid in the economy.

It is not muscular work alone which augments the activity of combustions. Brain work has the same effect, and Byasson, in a very remarkable monograph,[1] has shown us very clearly the increase of the excretion of urea under the influence of mental labor, as you mav judge by the following figures:

	Average of 24 hours. Urea.
1. A period of 3 days of rest	20.46 grammes.
2. " " muscular work	21.90 "
3. " " cerebral labor	23.88 "

Moreover, Moritz-Schiff has proved that cerebral labor raises the temperature, and Burdach, by his experiments, has demonstrated an increased consumption of oxygen under the influence of mental toil. If both muscular and mental work augment the combustions of the economy, it may be inferred that during sleep, when body and brain are at rest, there is diminished oxidation. This is what really takes place, and Boussingault, in his experiments on turtles, has shown that the quantity of carbon lost per hour which is 0.258 gramme during the waking state, is only 0.162 gramme during sleep.

Vasal, in his turn, has remarked that the mean for the urea excretion is 42.48 grammes for the twelve hours of day, and 36.24 grammes for the twelve hours of night.

There exists then a ration of labor as well as one of sustenance, and there is practically a sense in which the quantity of work done is proportional to the quantity of food ingested.

[1] Regnard: On the Mortality in the Provincial Hospitals, and on the Necessity of a Reform in the Administration of the Public Charities. (Progrès Méd., June 12, 1886, p. 489.)

[1] Byasson: The Relations which exist between Cerebral Activity and the Composition of the Urine. (Thése de Paris, 1868.)

Professor Germain Sée, who has recently delivered an interesting course of lectures on diet in health and disease, has in these lectures dwelt at length on the increase of food necessitated by labor. He would thus fix the daily fare of the workingman and the soldier:

	Azotized matters. grms.	Fats. grms.	Starchy matters. grms.
The workingman should consume	130–160	68	580
The soldier should consume	140–160	40–60	500

But it is to Hervé-Mangon that we owe the most precise and scientific indications as to the alimentary ration of sustenance and that of work. By an admirable series of investigations, which I cannot here even summarize, and for the details of which I must refer you to his writings,[1] he has arrived at the conclusion that the mean ration *per diem* of an adult living in France, *and by living kilogramme*, is 5.119 grammes of carbon, and 0.280 of nitrogen. In this total estimate it is important to distinguish the population of the large cities, like Paris, from that of the country. In Paris the consumption by day and by kilogramme is 5.673 grammes of carbon, and 0.332 gramme of nitrogen; in the country 5.808 grammes of carbon, and 0.275 gramme of nitrogen. The following table clearly shows these differences, from which it is seen that in the country more hydrocarbon is consumed and less nitrogen.

AVERAGE RATION BY DAY AND BY KILOGRAMME.

	Carbon. grammes.	Nitrogen. grammes.
For entire France	5.179	0.280
For Paris	5.575	0.320
For the country	5.808	0.275

Edward Smith has, in his turn, studied the minimum ration by day and by living kilogramme according to ages, and with the following results:

MINIMUM RATION OF SUSTENANCE ACCORDING TO AGES, BY DAY AND BY LIVING KILOGRAMME.

	Carbon. grammes.	Nitrogen. grammes.
Infancy	9.84	0.96
Age of ten years	6.84	0.40
Age of sixteen years	4.27	0.38
Adult age	3.60	0.20

In taking these last figures, 360 grammes of carbon, and 0.20 gramme of nitrogen, as the basis, the ration of sustenance for a man weighing 65 kilogrammes would be 234 grammes of carbon, and 13 grammes of nitrogen.

But these figures are modified in the following way when the individual works:

	Carbon. grammes.	Nitrogen. grammes.
Rest	234	13.00
Moderate labor	337.92	19.56
Hard labor	442.00	25.00

As you see by these careful statistics, there is a great difference between the ration of sustenance and that of labor, the ration of labor being nearly double that of sustenance.

In the great industrial enterprises, as, for example, the building of railroads, or the development of mines, the amount of work performed will vary according to the food supplied to the laborer, increasing or diminishing as the daily rations are abundant or insufficient; it is the same in zoötechnics, the horse doing an amount of work proportioned to the quantity of food which he consumes. In this production of labor do the azotized or non-azotized aliments play the principal part?

When, in 1842, Liebig showed that the special function of the muscles was the production of work, and that the necessary force was obtained only by the destruction of the albuminoid matters which the muscular tissue contained, all the physiologists of the period were agreed in accepting the division which he established of foods into non-azotized—which he considered as respiratory or calorifacient aliments—and azotized or plastic, which he thought were destined to repair the incessant wastes of the muscular system, and to which Liebig gave the names of "histogenetic" and "force producing."

But it was soon found that the augmentation in the production of urea had not *work* for its sole factor, and that the kind of food used had most to do with this increase; a sort of mixed theory now came into vogue, to which was given the name of *luxus-consumption theory*. In this *luxus-consumption*, it was supposed that only a feeble part of the azotized materials absorbed served for the reparation of the muscular tissue, and that the other part, the excess or *luxus* portion, being incapable of appropriation, was burned for production of animal heat, and eliminated under the form of urea and uric acid. Lehmann, Frerichs, and Schmidt have been the most conspicuous advocates of this *luxus-consumption* theory of Liebig.

But it was not long before new experiments, and especially the discovery of glycogen in the muscles, showed that during muscular effort the muscle consumes chiefly carbohydrates. Zoötechnic experiments confirm in a measure this view, in proving that in the herbivora the production of force is in relation with an alimentation which is non-azotized, and the experiments of Grandeau and Leclerc with the draught horses of the omnibus companies of Paris are in this regard completely conclusive, showing that non-azotized bodies, and especially carbohydrates, are, if not the exclusive, at least the preponderant source of the force which is manifested in muscular contraction.[1]

This conclusion, which I believe is applicable to herbivora, is it also applicable to omnivorous animals, and in particular to man? I do not think so; and while recognizing the fact that individuals living on a purely vegetable diet, like our peasants, may accomplish a considerable amount of hard work, it is nevertheless a fact that they can do a great deal more work when you augment the fat, and especially the azotized matters in their rations. This is, moreover, the conclusion to

[1] Hervé-Mangon: Traité de Genie Rural, Paris, 1875. On the Average Ration of the Inhabitant of the Country in France. (Acad. des Sciences, t. lxxix. 1874.)

[1] According to this view, plants accumulate force, and animals expend it. A plant while growing absorbs the solar rays, and thereby decomposes carbon dioxide, and stores carbon in its tissues. Thus the solar rays are transformed into static force, which accumulates in the plant. The animal consumes the plant, and converts this static force (latent in the plant) into *vis viva*, or work. So the circle of life completes itself on our earth. "The solar ray sleeps in the tissues of the plant to waken in the animal in the form of heat and work."—Hervé-Mangon.

which Lambing has arrived in his interesting treatise on the *Sources of Work and of Force in Living Beings*.[1]

Therefore, in the ration of work you ought always to augment in notable proportions the quantity of azotized materials, of starchy matters and of fat, the sum of which constitutes the daily fare of the workingman; and in the experiments made by the Western Railroad Company, the alimentary regimen which enabled the laborers to perform the maximum of work was as follows:

Meat	600 grammes.
White bread	550 "
Potatoes	1000 "
Beer	1000 "

In this study experimenters have gone even further, and have calculated the quantity of heat units and of kilogrammetres[2] produced by foods, and the data furnished by Frankland on this point are most interesting. By referring to the "mixed ration" table before given, you will find that, in accordance with Frankland's careful estimates, the number of heat units amounts to 2792, and it may be roughly stated that a man subjected to an average diet in our climate loses per day 3000 heat units, as the following table shows:

	Heat units.
For 124 grammes of dried proteid matter	541.6
" 430 " " " starchy matters	4806.0
" 49 " of fat	444.4
Total	2792.4

Or you may express it in this way, that an adult man produces by day and by kilogramme of weight, 1.5 heat units.

A man may transform into work, at the most, 540 heat units, which correspond to 229,500 kilogrammetres. Ordinarily, a man in working seven hours, does not exceed 100,000 to 150,000 kilogrammetres, and if we wished to establish on this basis, as Armand Gautier has done, the coefficient of the human machine, we might say that of 100 heat units produced, 25 serve to maintain our temperature; of the 75 which remain, 20 may be transformed into effective work, and the remaining 55 are lost in the friction of the machine. Our bodily machine then, from the point of view of the production of force, is not absolutely a pattern machine, since a great part of the force is lost.

We have just seen the importance of this estimate of heat-units, hence it is of interest to know what quantity of heat-units one kilogramme of different kinds of food may produce. Without reproducing here all the figures furnished by Frankland, I can give you the following calculation:

	Heat units.
One kilogramme of dried albumen, in undergoing transformation into urea, gives	4.368
One kilogramme of starch, in undergoing oxidation, gives	4.200
" " " fat " " " "	9.069

Moreover, experimental physiologists have gone still further in this study of nutrition, and have inquired into the foods proper for each organ; and while muscle consumes chiefly albumen, the nervous tissue appropriates albuminoid matters, and especially *lecithin*, a phosphorized fat, which, in conjunction with neurine, forms protogon; lastly, bones utilize calcareous salts, and, in particular, phosphates.

Such are the facts which I designed to present relative to daily rations; to complete them, you have but to cast your eyes over the following table, which shows the quantity of nitrogen and carbon furnished by the greater part of aliments which serve for the nutrition of man.

Name of food.	Nitrogen.	C + H. Combustibles calculated in carbon.
Beef steak	3.00 per ct.	11.00 per ct.
Roast beef	3.53 "	17.76 "
Veal	3.09 "	15.68 "
Fois gras (of goose)	2.12 "	65.58 "
Mutton chop	2.66 "	12.13 "
Salt herrings	3.11 "	23.00 "
Fresh "	1.83 "	21.00 "
Mackerel	3.74 "	19.26 "
Salmon	2.09 "	16.00 "
Eel	2.00 "	30.00 "
Mussel	1.80 "	9.00 "
Oyster	2.13 "	7 18 "
Lobster	2.93 "	10.96 "
Eggs	1.90 "	13.50 "
Cow's milk	0.66 "	8.00 "
Goat's "	0.69 "	8.60 "
Gruyere cheese	5.00 "	38.00 "
Roquefort cheese	4.21 "	44.44 "
Brie cheese	2.93 "	35.00 "
Chocolate	1.52 "	58.00 "
Wheat	3.00 "	41.00 "
Wheaten flour (superfine)	1.64 "	38.56 "
Rye flour	1.75 "	41.00 "
Winter barley	1.90 "	40.00 "
Indian corn	1.70 "	44.00 "
Buckwheat	2.20 "	42.50 "
Rice	1.80 "	41.00 "
Oatmeal gruel	1 95 "	44.00 "
White bread of Paris (44 per cent. of water)	1.08 "	29 50 "
Army bread of France	1.20 "	30.00 "
Fresh chestnuts	0.64 "	35.00 "
Dried chestnuts	1.04 "	48.00 "
Potatoes	0.33 "	11.00 "
Beans	4.50 "	42.00 "
Dried peas	3.66 "	44.00 "
Carrots	0.31 "	5.50 "
Mushrooms	0.60 "	4.52 "
Fresh figs	0.41 "	15.50 "
Dried figs	0.92 "	34.00 "
Prunes	0.75 "	28.00 "
Infusion of 100 grms. coffee	1.10 "	9.00 "
" " " tea	1.00 "	10.50 "
Fat pork	1.28 "	71.14 "
Fresh butter	0.64 "	83.00 "
Olive oil	traces.	98.00 "
Strong beer	0.05 "	4.50 "
Wine	0.15 "	4.00 "

In my *Diseases of the Stomach and Intestines* I have given a similar table, but this time I have simplified it, by referring all the figures to the quantity of nitrogen and carbon utilized by the economy. You can, by the help of this table, establish on scientific data the alimentary regimen of different patients. It will suffice to multiply the figure of nitrogen by 6.5 to obtain the weight of dry proteid matters contained in 100 grammes

[1] Lambing: Des origines du travail et de la force chez les êtres humains. (Thèse d'Agrégation, 1886.)

[2] Under the Continental system, the mechanical equivalent of heat is expressed in *kilogrammetres*, a kilogrammetre constituting one kilogramme (2.2046 pounds avoirdupois) raised to the height of a metre (3.2808 feet). Kilogrammetres are convertible into foot pounds by multiplying by 7.232; one kilogramme raised one metre high, equalling one pound raised 7.232 feet high.

of fresh aliments. You have only to know the weight of the individual, and to remember that in the adult the average alimentary ration should oscillate—by day and by living kilogramme—between the following figures: 6 to 9 grammes of carbon, and 0.360 to 0.250 gramme of nitrogen.

When once these data are mastered you will be prepared to go on with me to the consideration of insufficient and superabundant dietary regimens, and their application to therapeutics. In the next lecture we will take up the subject of insufficient regimen, and the treatment of obesity.

ORIGINAL ARTICLES.

A NOTE ON THE PRODUCTION OF CATHARSIS BY MEANS OF HYPODERMATIC MEDICATION.[1]

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IT is often necessary to produce catharsis with the least possible loss of time. It is also frequently the case that cathartics cannot be administered *per orem*, and that injections per rectum will not accomplish our purpose. In such emergencies, it has been our habit to rely upon croton oil, dropped upon and absorbed by the tongue; but experience will bear us out when we say that croton oil is not always reliable. How, then, are we to attain our object certainly, expeditiously, and safely? We must seek our reply in an appeal to the hypodermatic syringe, and that class of drugs which produce catharsis by their absorption into the circulation, and subsequent action through the nervous system. The list of the latter is of goodly length. We have already employed not a few of them upon the lower animals, and with the most gratifying results. We are not prepared to assert positively that we have found an agent which, when used hypodermetically, will invariably produce catharsis expeditiously and safely, but we believe that further observation—leading to a better knowledge of solubility and dosage—will establish this claim for two or more of the substances with which we have lately been working.

We present herewith the results of some observations upon cathartic acid, podophyllotoxin, and elaterin.

CATHARTIC ACID was first isolated from senna by Dragendorff and Kubly, in 1866, and described by them to be a glucoside, of weak, acid character, having the formula $C_{180}H_{109}N_4O_{82}S$. Cathartin was isolated and described by Lassaigne and Feneulle, who considered it the active, purgative principle of senna; but it was afterward found to be a mixture having little, if any, purgative properties, and it is now generally admitted that cathartic acid is the active principle of the plant. Cathartic acid has a brown color while moist, and is nearly black when dry. It is an amorphous substance, nearly insoluble in water, and insoluble in ether and alcohol, but readily combines with the alkalies and earths, forming salts soluble in water, which are decomposed by acids with precipitation of the cathartic acid. It may be purified by dialysis, as it has strong colloidal properties.

The cathartic acid used in these experiments was that found in the market, prepared by H. Trommsdorff. It was of a dark brown color, having an odor and taste resembling licorice. It was completely soluble in water, forming a wine-red colored solution. From its chemical and physical properties, we were convinced that the preparation was by no means pure, and the results here given are only of value so far as the commercial acid is concerned. We are now preparing the pure cathartic acid, and will soon be able to present data obtained by its use. The difficulty in obtaining, in a pure state, drugs which are little used, is recognized by every experimenter.

We have used cathartic acid four times upon young kittens. In the first two experiments we injected one-third of a grain and one-half of a grain, respectively. These kittens were in a poor physical condition when they came to us. The injections made into the subcutaneous tissue of the belly caused no discoverable local irritation. The kittens died in about two days, no catharsis having been produced; but, upon post-mortem examination, the small intestines were found empty and slightly injected, and the colon enormously distended with impacted feces. In the third experiment we employed one grain of the acid without local irritation or the production of catharsis. In the fourth observation two grains of the acid were used, and in ten hours free catharsis came on. The stools were at first hard; later, soft and clay colored. This effect continued for several days.

In two instances we used the cathartate of ammonium—giving one grain of the salt. One of the kittens experimented upon died in about thirteen hours, and, as in the case of the other two, the stomach and intestines were found empty and somewhat injected, and the large intestine distended with impacted feces. Free catharsis was induced in the other kitten in about four hours.

We propose now, from a chemically pure cathartic acid, to make a cathartate of ammonium of purity and known composition, and on the basis of our former observations, soon to determine the cathartic dose for man.

PODOPHYLLOTOXIN.—D. V. Podowissotsky (*Pharm. Zeitschrift für Russland*, 1882, vol. xx. p. 777) found, after careful examination, the root and resin of podophyllum to contain podophyllotoxin as the active purgative principle. This body he described as being composed of a resin-acid, picropodophyllic acid, and a neutral crystalline principle which he called picropodophyllin. Podophyllotoxin, when pure, is described as a bitter, white, resinous powder, soluble in weak alcohol and hot water, while that of commerce is a light yellow powder. It is precipitated from its alcoholic solution by water in large quantity. The slight color of the commercial article

[1] Read before the Cincinnati Medical Society.

is probably due to the coloring matter which has been imperfectly separated.

Brunton states that the resin of podophyllum "acts on the bowels when injected subcutaneously, as well as when introduced into the intestinal canal." In 1880, Dr. D. O. Brau reported that he had used podophyllotoxin as a purgative for children and found it completely to represent podophyllin. To a child 13 years old he gave from $\frac{6}{100}$ths to $\frac{9}{100}$ths of a grain.

We have used podophyllotoxin upon kittens three times, producing free catharsis in each case within an hour. In two of the experiments catharsis was carried to the extent of bloody, mucous passages, the bowels remaining loose for several days. In these cases there was no depression of any kind manifest until after many watery stools had been voided, when the cats betrayed the weakening effect of this drain of albuminous fluid. In one case the catharsis was promptly checked by the hypodermatic administration of a sixteenth of a grain of morphia. We have also used podophyllotoxin upon man four times —two of the cases being in the Cincinnati Hospital.

I will quote the notes of the resident physicians making the observations.

Dr. Nicehelser reports:

April 26. A. P., aet. fifty-eight. Chronic rheumatism. Bowels were usually irregular. Has now had a constipation of five days' standing. In the morning complained of pain in abdomen. Ordered tinct. opium gtt. x. Pain relieved. At 3.45 P. M., was given gr. $\frac{1}{10}$th podophyllotoxin in a fifty per cent. alcoholic solution hypodermatically. Hourly observations were made of pulse and temperature. Neither of these was in any way affected. Nine hours after the injection, at 12.45 A.M., he had one hard moulded stool, and at 5 A. M. another stool, soft in character. Thereafter his bowels continued regular until May 4, when he was discharged from the house. There was some local irritation at the point of injection, but it was inconsiderable in amount.

Mr. Mussey reports:

April 30. O. M., colored, æt. twenty-one. Syphilis of nine months' duration. Now has several abscesses on neck, and an antero-posterior curvature of the spine. Patient's bowels have been constipated and it has always been necessary to give a cathartic to bring about a movement, the one usually employed being epsom salts ℥ss. States to-day that he has had no stool for two weeks.

8.40 A. M. Gave ♏xx podophyllotoxin in solution fifty per cent. alcohol, equalling gr. $\frac{1}{10}$th of the drug, hypodermatically. Pulse 84, temperature normal.

9.40. No stool, pulse 84, strong and full. Temperature not taken.

1.40 P. M. No stool, nor has patient had any inclination in that direction. Pulse 72, good and full. Some swelling, redness, and tenderness at point of injection.

At some time during the early morning of May 1, patient had a large stool and during the day had another. No pain accompanied either movement. Questioning brought to light the fact that the night before the podophyllotoxin was given, the nurse had, without orders, given a dose of salts, which had produced a small stool that very morning. For some days after administration of drug, bowels moved without any trouble. Patient had at the time the podophyllotoxin was given, complete paralysis of motion and sensation in lower limbs.

The doses used in these cases were those recommended by Dr. Brau for children of thirteen years of age.

In view of the smallness of the dose, therefore, the results may be held to be satisfactory, especially when we consider that we were working with a preparation which was probably not at all equal in strength to chemically pure podophyllotoxin.

It will be observed that the absence of any effect upon the circulation and temperature is a matter of importance, especially in a class of drugs the influence of which, in the main, is depressing.

A few days ago, two healthy adults took respectively $\frac{1}{10}$th gr. and $\frac{1}{7}$th gr., hypodermatically, from this same solution that had been used in the Hospital, and was now some two months old. There was no cathartic effect produced, the glucoside having probably undergone decomposition. There was not a little local irritation at the seats of injection.

ELATERIN—$C_{20}H_{28}O_5$—is the principal constituent of elaterium, and when pure is obtained in colorless, shining, hexagonal scales or prisms, with an acrid and extremely bitter taste. It is soluble in 125 parts of alcohol at 15° C., in 2 parts of boiling alcohol, in 290 parts of ether, in amylic alcohol, carbon disulphide, and chloroform. It is insoluble in petroleum benzine. According to various authorities, it is present in elaterium in from 15 to 50 per cent. Brunton states that elaterin used in subcutaneous injections "acts on the nervous system, causing salivation, insensibility, tetanus, and dyspnœa, and also that it only acts as a purgative when taken internally, and appears to require bile in order to act." It is a powerful and valuable remedy, and is especially indicated in dropsies and in those cerebral affections in which a reduction of the general blood pressure is necessary.

The results of our experiments, if verified, will be much more satisfactory to the therapist. In two experiments we have used $\frac{1}{10}$th gr. and $\frac{1}{20}$th gr. of elaterin instantaneously. In neither instance was there any untoward effect—the kittens remaining playful and evidencing no discomfort during the time of operation of the drug, and in both cases large watery stools were produced within an hour. We have not, as yet, used it upon man.

ELATERIUM.—The striking difference in the results attained by us and those arrived at by other observers in the use of elaterin, urged us to extend our observations and make comparative experiments with elaterium.

Elaterium is a substance deposited from the juice of the squirting cucumber. It contains, besides elaterin, pectin, prophetin, ecbatin, or elateric acid, hydroelaterin, etc. We could not but think that a mistake had been made in setting down the physiological action of elaterium and its active purgative principle as identical, and we were inclined to believe that the distressing fatal symptoms observed after the hypodermatic use of elaterium were due to some other one of the ingredients of the juice than elaterin. It is certain that in no instance in our hands did the hypodermatic employment of elaterin lead to the results to be found set down in our standard text-books; while the employment of the elaterium did give rise to the apathy, somnolence,

coma, dyspnœa, convulsions, and death, as described by former observers. Our confirmatory observations were as follows:

An extract of elaterium was prepared by treating four grains of the pulverized elaterium with 120 minims of commercial alcohol, and boiling for a few minutes. After cooling, the clear extract was decanted from the insoluble residue.

In one case five minims of the solution (representing $\frac{1}{8}$th of a grain of elaterium) were diluted with an equal quantity of distilled water, and injected into a cat. In a second case ten minims of the solution (representing one-third grain of elaterium) were diluted with an equal quantity of water, and also injected into a cat.

The details of the cases are as follows:

Experiment No. 1.—Elaterium, gr. $\frac{1}{8}$th, 1.40 P. M. 2.21 hard stools. 2.25 disturbed respiration, salivation, muscular weakness, attempted vomiting, symptoms rapidly increasing in severity. Coma, convulsions, profuse salivation, apnœa, and death at 2.38. Autopsy: lungs intensely congested; heart ceased action in diastole, and was full of blood; stomach and upper part of small intestine empty, injected, and succulent; large intestine impacted.

Experiment No. 2.—Elaterium, gr. $\frac{1}{8}$d, 1.35 P. M. 2.45 some uneasiness. 3.45 somnolent. 4.30 still somnolent, apathetic, and has some salivation. No stool. No alarming symptoms. This kitten was given to the physiological laboratory the next day, that its organs might be used as injected specimens. When killed and opened, its alimentary canal was found to contain vast numbers of large lumbricoid worms. The small intestine was so distended that the injection was a failure.

We again used elaterin with the following results:

Experiment No. 3.—Elaterin, gr. $\frac{1}{25}$th, 11.12 A. M. 2.45 has been sleeping most of the time since the injection was given. 3.35 same as above. 5 no stool—no bad symptoms.

Experiment No. 4.—Elaterin, gr. $\frac{1}{12}$th, 11.16 A. M. 1.40 large watery stool. 1.47 copious watery, yellowish stool. 4.30 cat quiet—no bad symptoms.

NOTE.—The approaching departure of one of us for new fields of labor, interrupts the further prosecution of our joint observations. We, therefore, offer the results of our studies to our professional brethren without a promise of further extension, as a suggestion of what may be accomplished in the future, and as a guide, however insufficient, to the production of catharsis by means of hypodermatic medication.

CINCINNATI, August, 1886.

ON THE MICROÖRGANISMS OF LACTIC ACID FERMENTATION.[1]

BY H. G. BEYER, M.D., M.R.C.S.,

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The presence of microörganisms in liquids undergoing fermentation has hitherto been interpreted and explained in various ways. While some looked at these low forms of life as the mere associates of these processes, attributing the real cause of the resulting decomposition to chemical ferments, others, though believing in the causation of fermentation by microörganisms, looked at these processes as physiological ones or else attributed them to a certain power of adaptability possessed by certain microbes to different conditions of life.

Lister was, perhaps, the first clearly to point out the fact that the peculiar and characteristic fermentative process by which milk becomes sour, is initiated or directly caused by a certain species of microbe. While, however, Lister had proved this fact, it did not necessarily follow from his experiments alone, that the same process might not also be called into existence by a chemical ferment produced by the lacteal glands and which was already contained in the milk when it left these glands.

The matter, therefore, even after Lister's famous experiments, remained as undecided as ever, and the contention which had grown up between chemists and biologists for ages past, had not been diminished in any way.

In the mean time, our methods of bacteriological research having been greatly improved by the patient and admirable researches of Professor Robert Koch, it had become necessary to reinvestigate this whole question. This task has, indeed, been most ably performed by Dr. Hueppe, whose researches will be found embodied in a recent contribution to our knowledge of lactic acid fermentation and fermentation in general, published in the *Mittheilungen d. kaiserlichen Gesundheitsamtes*, Berlin, 1884.

In this paper Hueppe has, we think, successfully demonstrated the fact that lactic acid fermentation, or the process of the souring of milk, by which the sugar contained in milk is converted into lactic and carbonic acids, is directly dependent on or caused by a certain definite variety of microorganism, the morphological and physiological characters of which render it sufficiently distinct from any other known microbe.

Hueppe has demonstrated his point in the following manner: First, by showing that this particular organism is constantly associated with lactic acid fermentation; second, by separating it from other microörganisms; third, by cultivating it outside the original media in which it occurs, so as to separate chemical by-products; fourth, by the inoculation of pure cultures into the proper media, producing the characteristic decomposition; fifth, by ascertaining the biological conditions under which this process of fermentation is brought about in the best manner.

Although Hueppe himself is exceedingly guarded in his conclusions, the results obtained by him from the very accurate series of experiments made according to the most modern and advanced methods, will, no doubt, be fully realized by even those who are but slightly familiar with the history of fermentation and the long struggle which has existed for ages, and still exists between chemists and biologists with regard to the nature and causes of fermentation. This alone would, no doubt, form sufficient pretext for a critical examination and repetition of at least a portion of Hueppe's experiments. But aside from

[1] Read at the meeting of the United States Naval Medical Society, held Sept. 7 at the Museum of Hygiene, Washington, D. C.

this, and in spite of the fact that the importation of Hueppe's lactic acid germ is most likely to be an almost daily occurrence on this side of the Atlantic, the identity between it and the germs which cause the same decomposition in American milk, must be proven by the same methods and experiments, in order to make this mere supposition a certainty.

With this object in view, I gladly took advantage of an opportunity kindly offered to me this summer by Drs. E. D. Salmon and Theobald Smith, of the Bureau of Animal Industry, of working out this problem in their well-equipped laboratory.

In repeating Hueppe's experiments, so far as this was done by me, it was, of course, thought best to follow out the same course of experimenting and use the same methods as were used by him, and the first question, therefore, which naturally arose was, What microörganisms, if any, do we find in sour milk as it occurs in our market?

In order to determine this point, four sterilized test tubes were each charged with ten cubic centimetres of ordinary milk and set aside at the temperature of the room which, during our summer, is about 80° F. On the following morning, an examination showed that the contents of these tubes had undergone a change which seemed the same in all. A solid precipitate was found at the bottom of the tubes, showing only here and there a few superficial cracks or fissures and a slightly turbid, watery supernatant liquid; the precipitate was of the consistency of soft butter, and the liquid reacted very decidedly acid to litmus paper.

From each one of the test tubes several cover-glass preparations were now made and examined under the microscope, partly stained with methyl-violet, partly unstained. After a careful examination of these preparations, three different kinds of microorganisms were found to be present, namely: 1. A rather long and narrow, much curved bacillus. 2. A micrococcus. 3. A form of bacterium. The bacillus was found to be present in but one of the test tubes, the micrococcus in another, but the bacterium could be demonstrated as present in all four of the tubes, and in two of them it existed almost in the form of a pure culture.

It now became, of course, necessary to produce pure cultures of the various organisms which had been found, and to this end Koch's method of plate cultures was resorted to as follows: Three sterilized glass plates were thinly coated on one side with a layer of sterilized beef infusion-peptone-gelatine, previously liquefied at a gentle heat; the plates were supported by a glass vessel containing ice, and the whole protected by a bell-jar from dust and other atmospheric impurities, and set aside to cool until the gelatine had almost solidified. That time having arrived, a small trace of the contents of the tubes was taken out by means of a previously sterilized platinum wire, and each plate separately inoculated by drawing several lines lightly across it with the end of the wire which had been lightly dipped into the contents of the tubes.

All the plates were transferred under the bell-jar to a chamber in which the temperature remained constant at 70° F., which is sufficiently low to prevent the gelatine from melting, and still high enough to allow of the development of most bacterial organisms.

At the expiration of the first twenty-four hours after inoculation, all the lines which had been drawn over the surface of the plates seemed crowded with colonies of bacteria, the first lines on each plate having received more of the inoculated material than the rest, were continuous lines, the colonies having fused into one another. The margins of the lines were jagged, looking not unlike the plate of a fine saw with blunt teeth. The lower lines, however, showed distinct and isolated colonies having, apparently, originated from a single germ. Both lines and isolated colonies were of a porcelain-like whiteness, the latter looking like little drops of white paint sprinkled over the surface. Examined under a very low power of the microscope, most of the isolated colonies were seen to form round little knobs, projecting slightly from the surrounding surface and possessing very finely granular contents. There were also a few other colonies differing slightly from those described, but, owing to the fact that development in them had not as yet proceeded far enough, their characters were not very distinctly shown. On two of the plates quite a number of fungi had also developed.

From several of the isolated bacterial colonies, resembling in appearance the great majority of the colonies on the plates, two culture tubes containing sterilized beef-infusion-peptone were inoculated by means of a previously heated platinum wire. The colonies from which the material for inoculation was taken were identical in appearance with those described by Hueppe as "porcellanartige Knöpfe," being round or nearly so, with a well-defined contour, elevated and much thicker in the centre, uniformly slanting and growing thinner toward their margins.

Two other culture tubes containing beef-infusion-peptone were inoculated in the same manner from colonies showing slight differences from the majority of them, and all were set aside in a warm chamber, the temperature of which varied between 95° and 98° F.

On the following morning every one of the inoculated tubes showed slight but unmistakable turbidity, a very thin bluish-white membrane was seen floating on the surface and adhering to the sides of the tubes near the surface of the culture liquid.

Forty-eight hours from the time of inoculation a rather thick membrane was found on the surface of all four of the inoculated tubes, and the turbidity had considerably increased in extent. In two of them an abundant pulverulent deposit of a dirty yellow color was found to occupy the entire concavity of the bottom of the culture tube. These were the ones which had been inoculated from those colonies which showed slight differences from the majority. In the remaining two culture tubes this deposit was entirely absent, the membrane on the surface of the liquid, and the turbidity marking the only change which had taken place in them.

From the latter, several cover-glass preparations

were now made and examined under a one-eighteenth homogeneous immersion lens. The examination showed them to consist of a pure culture of the bacterium already mentioned, and to be described more in detail presently. Cover-glass preparations made from the other tubes proved their contents to be mixtures of all three of the original microörganisms observed in the sour milk.

Examined in the glass cell, the bacillus exhibited active movements, the micrococcus and the bacterium were both motionless.

From each of the two culture tubes containing the bacterium in the pure state, so far as that can be ascertained by cover-glass preparations, two plate-cultures were now prepared in the following manner: About ten cubic centimetres of sterilized beef-infusion-peptone-gelatine were liquefied in a test tube by gentle heat over a Bunsen burner, a very small quantity from the pure culture was transferred into the liquefied gelatine by means of a heated platinum wire, and the contents, after slight agitation, poured on a sterilized glass plate and set aside to cool, well protected by a bell-jar. The temperature of the chamber remained constant at 70° F.

On the next morning an examination showed that the whole surface of the gelatine-covered plate was thickly studded with a rich growth of colonies which, to the naked eye, were small, round, of a dirty white color and a peculiar lustre; they were slightly elevated from the surrounding surface of the gelatine, pretty uniform in size, and very evenly distributed and not liquefying gelatine. No differences whatever could be made out as existing between the colonies either by the naked eye or by means of the microscope.

Cover-glass preparations, made from a number of these colonies, which were afterward examined by means of the one-eighteenth homogeneous immersion lens of Zeiss, partly stained in methyl-violet, partly unstained, showed that on all pure cultures of the bacterium were present which was identical with that described by Hueppe as bacillus lactis.[1]

Four culture tubes, containing beef-infusion-peptone, were next inoculated each with a small trace of material coming from a different colony on the plates, and placed in a chamber where the temperature remained at 98° F. At the end of the first twenty-four hours from the time of inoculation, an examination showed slight turbidity in the contents of the tubes; in all, a very thin and delicate bluish-white membrane could be seen floating on the surface of the liquid and adhering to the sides of the tubes. After forty-eight hours from the time of inoculation, the membrane had grown slightly thicker and fell to the bottom on slight manipulation. Cover-glass preparations made from each of these cultures showed bacterium lactis in a state of purity.

In the same manner as described for bacterium lactis, pure cultures were obtained from the coccus and also the bacillus mentioned above. For, although it was to be supposed that the bacterium was the organism in question and that both bacillus and coccus were mere accidental impurities, it had still to be proven by actual experiment that this was no mere supposition, but the fact, and for this reason pure cultures were made from them also.

Four culture tubes, containing about ten cubic centimetres each of milk, sterilized by discontinuous heating, were now inoculated from one of the pure cultures of bacterium lactis and set aside in the culture-oven. An examination of these tubes, twenty-four hours from the time of inoculation, showed very plainly that the change characteristic of the souring of milk had already taken place. A precipitate or deposit had formed which was both voluminous and solid, showing a few superficial cracks and fissures which deepened somewhat during the succeeding days. The supernatant liquid was clear and watery, possessing a very decidedly acid reaction. Further examination showed the characteristic microörganism in the pure state.

Several culture tubes, containing sterilized milk, had also been inoculated with pure cultures of the bacillus and the coccus respectively, but no such change was found to have taken place in them. In fact, with the exception of a slight yellowish discoloration, no change whatever was noticed in them, the milk having remained fluid even up to the end of the fourth day when observation on them was discontinued.

The milk used in these experiments had been sterilized by discontinuous boiling. According to Hueppe, milk may be sterilized by a temperature of 75° C., but 100° C. is perfectly admissible, though higher ones are not.

So far, then, a peculiar bacterium, identical in all respects with that described by Hueppe as bacillus lactis, had been found constantly associated with the process of lactic acid fermentation; the bacterium had been isolated and pure cultures produced from it, the inoculation of which into sterilized milk produced the characteristic decomposition, while pure cultures from the other microörganisms inoculated in the same way did not produce this change.

It still remained to be proven that the peculiar and very characteristic change brought about by the inoculation into sterilized milk of a pure culture of this germ, was due to the decomposition of the sugar contained in milk into lactic and carbonic acids.

To this end a large quantity of a solution of certain salts in distilled water was made, recommended by Hueppe as best supporting the growth of this bacterium. The solution contained dipotassium phosphate 0.3 per cent., magnesium sulphate 0.1 per cent., and chloride of calcium 0.025 per cent. A fine flocculent precipitate was formed when the salts were mixed together; this precipitate was not filtered off, but was allowed to remain in the solution. Using this as a menstruum, three culture flasks were charged with 100 centimetres each of the solution. To

[1] The term *bacillus*, which has been applied to this form of bacterium, by Hueppe and also by Dr. James Eisenberg (*Bacteriologische Diagnostik*), is by no means incorrect. A bacterium which, according to the medium in which it happens to be cultivated, is found to vary in length all the way from 1-2.5 μ, may, perhaps, well deserve the name of *bacillus*; when, however, it is cultivated in mik and examined before the process of fermentation has ceased—in other words, when this process is at its height—its length, according to Hueppe's own measurements, remains within that of a bacterium; and we have, for this reason, preferred the latter term to that of bacillus.

one of the flasks one gramme of peptone was added, to another, three grammes of milk sugar, and to the third, three grammes of glucose were added. Three exhaustion bulbs were likewise charged with about ten cubic centimetres each of the same fluid. All the flasks and bulbs being well protected with cotton plugs, were now sterilized in the steam sterilizer, where they remained for two consecutive hours; the thermometer showing that the maximum temperature during that time had reached 108° C.

On the following day the three flasks were inoculated with a pure culture of bacterium lactis and placed in the culture oven. The bulbs were likewise inoculated, and immediately afterward the air was exhausted by means of an air-pump which was kept working steadily for fifteen minutes, the bulbs being immersed in a water bath, the temperature of which was kept at 103° F. At the end of that time, the necks of the bulbs, having been previously drawn out to a fine capillary tube, were sealed up by means of an alcohol flame, and thus hermetically sealed they were placed in the culture oven and kept at a temperature varying between 95° and 98° F.

Those of the flasks and bulbs which contained the sugar solutions had changed color slightly during sterilization. The solutions, from being colorless or almost so, had assumed an amber tint, due, of course, to the fact that some of the sugar had been caramelized by the heat applied to it during the process of sterilization. The precipitate which formed on mixing the various salt solutions together, had become somewhat granular and settled to the bottom, leaving a perfectly clear supernatant fluid.

On the following morning, or about twenty hours from the time of inoculation, the contents of all the culture flasks had become turbid, the exhaustion bulbs, on the contrary, remaining perfectly clear. Forty-eight hours after inoculation, those of the culture flasks containing the sugars in solution, exhibited signs of active fermentation. An abundance of large air bubbles had collected on the surface and small ones could be seen constantly rising in the fluid. Nothing like this was noticed about the bulbs. This process of fermentation seemed to be ended on the fourth day, when all the flasks became turbid, and membranes had formed on the surface of the fluids, especially on the surface of the peptone solution.

On the eighth day after inoculation the contents of the flasks were examined. Pure cultures of bacterium lactis were found to be present in every one, as was easily ascertained by cover-glass preparations. The reaction of the fluids containing the sugars in solution was very decidedly acid. The quantity of the acid as determined volumetrically, was 0.125 or exactly one-eighth of a per cent., and was the same in both the flasks.

The bulbs from which the air had been exhausted, by means of an air-pump, showed no traces of either turbidity or fermentation after an exposure in the culture oven to a temperature of 98° F. for the period of two weeks. At this time, the sealed points of the necks of the bulbs were broken off under a sterilized cotton plug, and both turbidity and fermentation appeared promptly on the following day, bacterium lactis developing quickly and abundantly in the pure state as was afterward ascertained by cover-glass preparations.

All these experiments were repeated several times with results practically identical with those which have been here described. In some of the experiments the sugar solutions had been exposed to too high a temperature (112° C.) during sterilization, and, consequently, most all the sugar had been caramelized; the quantity of lactic acid produced, therefore, was not equally large in all cases, but enough had remained to give an acid reaction to litmus paper.

In salt solutions, made with the acid phosphate of potassium instead of with the dipotassium phosphate, bacterium lactis remained undeveloped and no sign of either turbidity or fermentation was noticed, even one month after inoculation.

While thus engaged in the study of the physiological properties of bacterium lactis, Dr. Theobald Smith was investigating the character of a bacterium obtained from the spleen of a pig supposed to have died of swine-plague. Examining one day some of his cover-glass preparations, I was impressed with the remarkable morphological similarity existing between the two germs. Discussing the subject, I was informed by Dr. Smith that this germ turned sterilized milk sour, and this led me to investigate further the germ in its relation to lactic acid fermentation.

A fresh lot of salt solutions was accordingly made and four culture flasks were charged with 100 centimetres each. Two of them received three grammes of milk sugar, and the remaining two three grammes each of cane sugar. These solutions were sterilized by discontinuous boiling. The boiling was kept up for five minutes, and done once a day for five days; the solutions remained colorless and came out perfectly clear and transparent. After sterilization one of the sugar- and one of the lactose-containing flasks received a small portion of a pure culture of the supposed swine-plague germ,[1] and the other two were inoculated with bacterium lactis.

Forty-eight hours after inoculation fermentation was found to be active in the flasks inoculated with bacterium lactis, as was evidenced by the number of air-bubbles rising to the surface. No change whatever, with the exception of some turbidity, was noticed in the flasks which had been inoculated with the supposed swine-plague germ.

At the expiration of two weeks of exposure to a temperature in the culture oven of 98° F., the contents of the flasks were examined. Those inoculated with bacterium lactis were very decidedly acid to litmus paper, those containing the bacterium of swine-plague reacted slightly, but distinctly alkaline, thus, leaving bacterium lactis alone in the field as possessing the power of converting sugar into lactic and carbonic acids.

The quantity of lactic acid, as determined by volumetric analysis, for the sugar flasks, was 0.178 or nearly one-fifth of one per cent.

[1] Presumed to be a modification of the germ which gives rise to swine-plagues in the East; was brought from the State of Illinois.

Bacterium lactis may be described as a short, thick, plump, little rod, distinctly ovoidal in shape, about half as broad as long, and varying in length from 1 to 2 μ, its breadth remaining tolerably uniform. The best specimens may be found in milk cultures, the smallest in beef-infusion-peptone-gelatine cultures. As the bacterium lengthens, a slight constriction about its middle portion becomes noticeable which soon broadens and deepens, giving rise just before complete division takes place, to the figure-8 form. This form becomes more especially noticeable in preparations stained with methyl-violet, which leaves a very minute central portion of the protoplasm unstained. The germ does not liquefy gelatine, and when examined on the hollow slide, it is found to be motionless. With regard to spore-formation, our experiments have not been attended by very positive results, although everything else seems to indicate that they do form spores. The settlement of this question will form one of the subjects of future investigations.

The results of the foregoing experiments have led me to agree fully with those obtained by Hueppe, namely: lactic acid fermentation, or the process of the souring of milk during which the sugar contained in the latter is converted into lactic and carbonic acids, is directly dependent on or caused by the life and growth of a certain definite variety of micro-organism, the physiological characters of which are sufficiently distinct to differentiate it from any other known organism, and which, therefore, may be properly designated as bacterium lactis.

A MODIFICATION OF WEIGERT'S METHOD OF STAINING THE TISSUES OF THE CENTRAL NERVOUS SYSTEM.

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THE specimens, hardened in Müller's or Erlicki's fluid, are transferred directly (without coming in contact with water) to alcohol 70 per cent. The pieces to be embedded are now gradually dehydrated, advancing from 70 per cent. to 95 per cent. alcohol, and finally to absolute. After soaking in absolute alcohol for several days, they are transferred to a mixture of equal parts of ether and absolute alcohol, and allowed to soak for one or two days; they are then transferred to a solution of celloidin, and are embedded in celloidin on cork.

The pieces, fastened to a cork with celloidin, are immersed in a solution of neutral acetate of copper (a saturated filtered solution of this salt, diluted with an equal volume of water), and allowed to remain in an incubator at 30° or 40° C. for one or two days.

The specimens become pea-green after the copper treatment, the celloidin mantle more of a blue-green; they may now be preserved in 80 per cent. alcohol indefinitely.

After having made the sections, which must still be kept clear of water, they are immersed in the hæmatoxylin solution, the formula for which is as follows: hæmatoxylon (Merck's, in crystals), one part; absolute alcohol, ten parts; water, ninety parts; boil twenty minutes, cool and filter, and to each one hundred parts add one part of a cold saturated solution of lithium carbonate.

The time required for staining varies with different specimens; in general, the rule prevails that the longer one colors, the surer the result; for cord sections, two or three hours are usually sufficient; in brain sections, twenty-four hours are required in order to color the very fine fibres of the cortex.

After staining, the sections, now black in color, are differentiated by immersion in the following solution: borax, two parts; ferricyanide of potassium (red prussiate), two and one-half parts; water, one hundred parts. It will be found that the time required for perfect differentiation varies in different specimens: in cord sections, it usually takes from one-half hour to several hours before the desired contrast between white and gray matter is obtained, and in brain sections it is longer. No fear of spoiling the sections need be felt. I have frequently allowed sections to remain in this solution for twelve hours without ill result.

From this solution the sections are transferred to water and well washed; then to 80 per cent. or 90 per cent. alcohol; they are then spread on slides and dehydrated thoroughly with absolute alcohol, and then clarified. I prefer xylol or creasote for clarifying, and xylol or benzole balsam for mounting.

If the steps in this method are carefully followed, success is certain; and it is without exception the method for tracing nerve fibres or demonstrating nerve lesions.

HOSPITAL NOTES.

DISPENSARY FOR NERVOUS DISEASES, BALTIMORE.

Service of JOHN VAN BIBBER, M.D.

SOME ANOMALOUS AND COMPLICATED EXAMPLES OF CHOREA.

WHILE there is no definite pathology for chorea, and it is possible that different types of the disease may be due to entirely distinct causes, it is very interesting to study the following cases, which I select from the notes of my assistant, Dr. H. C. Ohle.

CASE I. *Chorea Nutans seu Vibratoria.*—M. K., ten years of age, was presented for treatment March 16, 1886. Both arms were affected with a constant and *regular* twitching, which also involved the head to a less degree. The twitching of the arms was as constant and rhythmical as in a severe case of palsy, and was not choreic in type. Patient gave a history of having been subject to severe attacks of malarial fever for several years. The child was well nourished, strong, and finely developed. On the morning of March 13, 1886, she was seized with a slight chill, followed by diarrhœa and fever; on the evening of the same day she developed slight tremor of the right arm, which gradually involved the left arm, and finally the head. There was no history of punishment or fright. From the day when the first symptoms appeared until she was presented for treatment, the twitchings became so exaggerated in force and frequency that the child could not obtain sleep or rest. No other portion of the body was affected.

On examination, all the organs were apparently in

a healthy condition, functions properly performed, and her appetite fairly good. Treatment: friction with sedative lotions, quiet and rest in bed, hot douches to her spine; at night, potass. bromide to induce sleep, succ. conium, Fowler's solution, and bitter tonics. By March 25th, under this treatment the twitchings of head had entirely disappeared, and the tremor in the arms was much less pronounced and exhausting. April 5th, the tremor had entirely disappeared, leaving the general health in as good condition as could be expected after three weeks' close confinement to bed. She was discharged cured, with instructions to continue for several weeks the treatment prescribed.

Remarks. This little girl showed, in a highly exaggerated form, the movements of a marked case of paralysis agitans. The motions of the head and arms were rhythmical and violent. The lower extremities were not disturbed. It was considered necessary to treat the case in bed, yet it was impossible for her to lie down with any comfort, for the movements were continuous, except during the time when she was actually asleep. Toward the end of the attack the movements became more choreic in character. The hot spinal douche was more productive of sedative effect than any other remedy. There was no history of rheumatism, and in chorea complicated by this disease I have learned to look for general choreic symptoms. The pathological condition was evidently confined to the upper portion of the spinal cord, for we could hardly suppose the motor centres in each hemisphere to have been similarly affected.

CASE II. *Post-hemiplegic Chorea.*—C. H., six years of age, was presented for treatment March 15, 1886. She was affected with apparent paralysis on the right side of the body, involving both the right arm and leg; in addition, she was completely aphasic. On inquiry, it was learned that she was quite healthy and robust until last fall, when she suffered with a protracted attack of malarial fever, which debilitated her very much. She was considered well, however, when, on Feb. 19th, of this year, she was badly frightened by a pet monkey, which attacked her, and attempted to bite her. The mother claims that she was thrown into a spasm; when she recovered from this attack it was found that she had lost her speech, and was paralyzed on the right side. After a time, choreic movements began to develop, which were, however, slight in degree. This condition gradually grew worse. She lost interest in her play, and became stupid. On examination, I found a right hemiplegia, with inability to pronounce even the simplest words; she could not protrude her tongue and hold it still, and the affected side showed decided choreic twitchings. The child was very anæmic, restless at night, and had loss of appetite. The case was diagnosticated as a post-hemiplegic chorea, and treated with mercurial inunction, and ammonium carbonate in solution. Potassium bromide was given at night, to induce sleep. She was ordered to rest quietly in bed, and a hot spinal douche at night. Under this regimen the child recovered with remarkable rapidity; her appetite improved, and with it her general condition. The functions of her limbs have again been restored; she can pronounce words sufficiently well and clearly to be readily understood, and a speedy and complete recovery is anticipated.

On referring to the Dispensary Case Book, I find that the child was discharged well in the latter part of April.

Remarks. In this case of hemi-chorea, resulting from a unilateral brain lesion, we have the reverse of the usual order of symptoms. In severe cases of hemichorea we find, after some weeks, a resulting paresis in the muscles of the diseased side, which almost amounts to a hemiplegia, and in this case we find a right hemiplegia and aphasia, followed by a decided chorea in the paralyzed side. The improvement in the case, however, proves that the brain lesion was functional, rather than organic, and gives an interesting lesson in prognosis. The minute embolism theory would seem to give the most reasonable pathology for the chorea, and the transitory stage of hemiplegia was most likely due to some gross circulatory lesion of the brain.

CASE III. *Chorea with Histrionic Spasm.*—F. K., fifteen years of age, presented himself for treatment at this Dispensary February 26, 1886. He was well developed for his age, but anæmic and apparently poorly nourished. He gave the following history: About six weeks previous to the date mentioned, his appetite began to fail, and he noticed a twitching of his left eyelid, which he could not control. Then he found that he would drop articles which he held in his hand; this occurred so often that he was compelled to stop work. The twitchings of his left eyelid became aggravated, becoming more frequent in number and longer in duration, the right eyelids not being affected at all; the irregular movements of both arms increased in violence, and finally extended to the legs. On examination, I found that the muscles of the left side of the face, particularly of the left eyelid, in less degree, and the muscles of left side of the mouth, were affected by clonic spasms, the attacks following each other in rapid succession, with intervals of rest, during which the movements of the left side of the face were normal. At the same time both arms were found affected with choreic movements of a mild type; also both legs, though in a less degree. The right side of his face was perfectly normal; his speech was not at all affected, nor did we find any choreic movements of the muscles of either side of his face. This is the first attack of the kind, and he had otherwise been healthy. He was ordered to remain as quiet as possible, and to rest, retiring early, and remaining in bed late in the morning. Sponge baths daily, to be followed by rubbing with a coarse towel. He was ordered nutritious and easily digestible food, and bitter tonics and iron preparations, in connection with conium, were prescribed in full doses. This treatment was followed by marked improvement at the end of one week. This was kept up, with slight modifications, for one month, the patient being discharged March 25th, apparently entirely well.

Remarks. The convulsive tic or histrionic spasm in this case was so marked and so entirely different from the movement of the muscles of the extremities, that it looked as if two distinct diseases were present. If both these morbid movements were brought on by the same cause, certainly the local irritation of the left motor nerve of the face was much greater than the impression which produced the choreic movements of the arms and legs. The spasms of the muscles of the left side of the face were symmetrical and paroxysmal, the movements of the other muscles were irregular and choreic in character. The symptoms of central origin, as demonstrated by the disturbance in the function of a motor cranial nerve, differed entirely in nature and intensity from the symp-

toms of spinal origin, as manifested by the exaggerated movements of the extremities. And yet the prompt and satisfactory improvement of all symptoms under a general treatment, seems to prove that the cranial spasm and the spinal incoördination were due to the same cause.

MEDICAL PROGRESS.

COLD BATHS IN SCARLATINA.—MOLIÈRE presents two cases in which cold baths were successfully employed in the treatment of the hyperthermic stage of scarlatina. The baths were of short duration (five to eight minutes) and of a temperature of approximately 72° F. One of the patients manifested a very grave angina with considerable hypertrophy of the ganglia of the neck, and the other suffered from gangrenous angina. Neither pneumonia nor pericarditis was developed, and an albuminuria which had existed in one of the patients, disappeared quite rapidly.—*Gazette Hebdomadaire*, September 17, 1886.

A CASE OF RAPID PLEURAL EFFUSION TREATED BY ANTISEPTIC INCISION.—DR. ALBERT WILSON narrates in the *Lancet* of October 9, 1886, the following case, which is of interest, as it shows the advantage of an incision made during the early stage of pleural effusion before it had become a case of empyema. In fact, the effusion was so large and so rapid, and the dyspnœa and cardiac depression were so great, that the case would never have reached the stage of empyema if prompt operative treatment had been delayed.

The patient, Mrs. B., aged thirty-five, was first seen by me on March 3, 1886. She complained of breathlessness and increased cough, and she had been ill nearly a week. There had been no rigors; the pulse was 140, small and weak; the expectoration was mucous, slightly rusty; respiration 40; temperature under the tongue 102°. On examining the chest, the left base was dull on percussion. The front of the chest was normal in all respects. Auscultation: At the right base there were moist râles and crepitations; at the left base there were no respiratory sounds audible; vocal resonance was increased over the right base, whilst it was ægophonic over the left base; vocal fremitus was increased over the right base, but absent over the left. The absence of vocal fremitus decided the diagnosis as pleurisy and pneumonia.

March 4. The dulness is higher posteriorly, and in the axillary line there is also dulness in front from the left side when she sits up. The first sound, which is weak, is loudest behind the sternum. Temperature 101°; pulse 140; respiration 46.

5th. General condition worse, and increased effusion. Absolute dulness at and below the third rib in front, and from a line parallel with the fourth dorsal vertebra behind. The right chest is normal, except for cardiac dulness over the fourth right costal cartilage. The apex of the heart is now almost under the right mamma. There is a total absence of respiratory sounds all over the left chest, both back and front, except above and just below the clavicle. Ægophony is well marked at the angle of the left scapula, the vocal resonance is altered in front, vocal fremitus is absent on the left side, and there are moist sounds over the right base. Temperature 101°; respiration 48; pulse 140. The pulse tracing shows a very small wave, due to the feeble cardiac impulse and the contracted arteries. Operative treatment was now imperative. Being a disciple of Lister, I did not feel justified in opening this large cavity without the spray, as it was a small foul room, and the impure air entering the pleural cavity would be very dangerous and certain to cause suppuration. Further, to wash out the cavity, which I had allowed to become septic, would be an unnecessary labor for me, and a needless and a rather dangerous entertainment for the patient. I preferred prevention to cure. I made an incision between the seventh and eighth ribs posteriorly to the axillary line. Clear serum poured forth in abundance; more than five pints were collected and about a pint was wasted. Air entered the chest freely. When I introduced my finger through the ribs, I could not reach the lung for at least half an hour after the incision was made. When the lung did expand the surface of the pleura was found to be quite rough. A tube four inches long was inserted downward and backward, and I applied a small dressing of boracic lint soaked in mercurial solution. Within an hour the heart sounds were to be heard under the left breast. Friction was heard posteriorly as soon as the pleural surfaces were apposed. The friction gradually appeared from above downward, as the expansion of the lung was very gradual, and when I left it had not fully expanded at the base, which I proved with my finger. The pulse tracings, taken every few minutes, were very interesting. Before the operation it was a slight deviation from a straight line, being so feeble. Soon after the operation the pulse wave expanded, getting larger and fuller, until there was a full, sharp, apex systolic wave with a marked dicrotic wave, showing low arterial tension, due to the relaxation of the arteries and the removal of the pressure on the heart and main vessels.

6th. Temperature 101°; pulse 120; respiration 32. The wound was dressed under the spray. There was a free serous discharge through the tube, and the air entered with inspiration. The physical signs of pleurisy are well marked.

7th. Temperature 101°; pulse 120; respiration 26. Wound dressed and tube removed. I inserted my finger to feel the pleura. It felt rough and spongy, like placenta. I passed my finger round, separating the adhesions of the two surfaces, and it reminded me of a case of placenta prævia. It was the adhesion of the surfaces that determined me to remove the tube.

8th. Temperature 101°; pulse 108; respiration 26.

10th. Temperature 100°; pulse 98; respiration 24. Wound dressed. Very little thin serous discharges. Physical signs normal over both lungs. I could not trace the cause of the slow fall in temperature. The patient, though very weak, is doing well considering that she was at death's door before I operated.

15th. Temperature 99°; pulse 90; respiration 20. Wound dressed, and healing satisfactorily. Before the operation I measured each side of the chest from the anterior to the posterior mesial line just below the mammæ. The right half was 16 inches, the left 17½ inches. To-day, five days after the operation, each side measures 16 inches alike. The spine is perfectly straight, and the left chest is not shrunken. These results could not be attained by aspiration, however

skilfully done. The patient was soon restored to perfect health.

THE TREATMENT OF THREAD-WORMS IN CHILDREN.—DR. SIDNEY MARTIN writes as follows to *The Practitioner* of October, 1886:

The complete cure of thread-worms in children is often very difficult. While the ordinary methods used, such as rectal injections of salt and water, infusions of quassia, and other remedies, do good for a time, yet they often fail to relieve the attendant symptoms of "worms," symptoms usually very irregular, and in some cases severe, in character. In many cases, though the irritation about the anus is relieved by injections, the irregularity of the bowels and the disturbance of sleep remain the same. This is probably due to the fact that the habitat of the worms is higher up in the large intestine, where no remedy introduced by the rectum can reach them.

In many cases I have found that rhubarb in small doses brings away large numbers of worms, and at the same time regulates the bowels: so that the use of injections may in most cases be dispensed with. The formula which I have found most useful is as follows, varying slightly with the age of the child:

℞.—Tincturæ rhei	♏iij.
Magnesii carbonatis	gr. iij.
Tincturæ zingiberis	♏j.
Aquam	ad ℥j.

This is to be taken twice or three times daily, according to the effect on the bowels. Whether the rhubarb acts as a vermicide or simply by "moving the worms on," I am unable to say.

PHARYNGEAL AND LARYNGEAL "NYSTAGMUS."—DR. HERBERT R. SPENCER writes as follows to the *Lancet* of October 9, 1886:

I am indebted to Dr. Gowers for permission to publish the following observations I have made on a patient under his care at University College Hospital. The patient, a girl aged twelve, has a cerebral tumor, and presents the symptoms of reeling gait (with a tendency to fall backward and to one side, usually the right), vertigo, intense occipital headache, constipation, vomiting, ocular nystagmus, but no optic neuritis. The pulse is usually 100. These symptoms have been present for the last fifteen months. The ocular nystagmus is vertical and horizontal, occurs at the rate of 180 to the minute, is slightly increased in frequency during accommodation for very near, or in looking at far distant objects. On examining the throat, I noticed the superior constrictor of the pharynx to be in a state of constant rhythmical movement in a horizontal direction, as if the posterior pharyngeal curtain were being rapidly drawn together, the twitchings occurring at the same rate as the movement of the eyes, 180 to the minute. The movement does not affect the soft palate or pillars of the fauces, the faintest possible tremor only being transmitted to them from the action of the adjacent constrictor. By pressing the point of a quill pen againt the pharynx and pivoting the quill on a pin held fixed against the upper teeth, I have been able to write with the feather end a tracing of the movement on sphygmograph paper. The laryngeal muscles are similarly affected. The arytenoid cartilages are seen rapidly gliding to and from each other synchronously with the movement of the pharynx. When the patient is breathing quietly the main movement of widening the glottis during inspiration is interrupted by slight twitches, and similarly the movement of respiration. When the patient stops breathing the cords gradually close with five or six contractions, till they finally lie parallel and close to each other; here they remain, undergoing only a slight tremor till the patient recommences to breathe. I have had this patient under observation for over two months, and the movement has always been present. There is now a slight alteration in the state of the larynx, in that the left cord twitches more than the right, and the cords do not so nearly close when the patient stops breathing. I am not aware that a movement of this kind has been previously described, and I am anxious that it should be looked for in cases of intracranial tumor, so that its localizing value may be determined. It is possible it may throw some light on the etiology of ocular nystagmus, and it may be of value to the surgeon, perhaps, in showing pressure on the medulla, and so assist in the diagnosis of the position of a cerebellar tumor. As regards the term "nystagmus" applied to the pharynx and larynx, its association and synchronism with the ocular nystagmus, and the fact that movement of the eyes in a horizontal direction is called "nodding," would seem to warrant a slight departure from strict etymological accuracy.

COCAINE IN GONORRHŒAL OPHTHALMIA.—A. LEAHY, I.M.S., recommends a trial of cocaine in gonorrhœal ophthalmia. In his hands he has found that the ocular and circumorbital pain is much diminished, the chemosis reduced, and the congestion of the conjunctival vessels much diminished. He used the following preparation: Cocain. sulph. 4 gr., atrop. sulph. ½ gr., vaseline 100 gr. To be applied with a camel's hair brush.—*Indian Med. Gazette*, July, 1886.

SUPRAPUBIC LITHOTOMY. — THOMAS ANNANDALE, F.R.S.E., writes as follows in the *British Medical Journal* of October 9, 1886:

In the *Journal* of January 2d of this year, I published an account of a new method of performing suprapubic lithotomy in male children, and I reported a case in illustration. Since then, further experience has convinced me that this method is an improvement in the case of adults, as well as in the case of children; and I therefore trust that some of my surgical friends will try it and report their experience.

Briefly stated, the steps of the operation are:

1. The gradual and thorough dilatation of the bladder by the injection of some antiseptic fluid.

2. The introduction of a lithotrite, and the seizing and fixing of the stone in its blades.

3. The depression of the handle of the lithotrite, so as to press the stone against the abdominal wall immediately above the pubes in the middle line.

4. Cutting down through the abdominal wall, in the middle line, upon the pubes, and immediately above it, in the usual way, until the bladder is reached.

5. Depressing the handle of the lithotrite still more, so as to stretch the wall of the bladder over the stone, and make it prominent at the wound.

6. Incising the stretched bladder wall upon the stone, to a sufficient extent, in a direction downward, and then protruding, through the opening, the stone and blades of the lithotrite.

7. Gently opening the blades of the lithotrite and removing the stone, and in withdrawing the lithotrite, catching one end of an India-rubber catheter in its blades, and bringing it out through the urethral orifice, the other end of the catheter being left in the bladder.

8. Stitching the wound in the abdominal wall, and introducing a drainage tube at its lower end.

If the wound in the bladder wall be small, I think it is better not to stitch it; but if it be large, two or more catgut sutures should be inserted.

The dilatation of the rectum is not, in my opinion, required, and if employed, only complicates the operation.

FAILURE OF THE BACTERIAL TREATMENT OF CONSUMPTION.—At a recent meeting of the Odessa Medical Society (*Proceedings of the Odessa Medical Society*, 1886, No. 6, pp. 1–12), DR. FILIPOVITCH, of the Odessa Town Hospital, made a very instructive communication on six cases of advanced pulmonary phthisis, which had been treated by him after the bacterio-therapeutic method recommended by Professor Arnaldo Cantani (see the *British Medical Journal*, 1885, August 29th and Nov. 18th; and 1886, March 6th and 13th). Having obtained by fractional cultivation, pure cultures of the bacterium termo in meat broth, the author took five cubic centimetres of the bacterial fluid, diluted them with ten cubic centimetres of boiled water (37° C.), aromatized the mixture with one or two drops of tincture of peppermint (to disguise an offensive odor), and made the patient inhale the whole by means of Richardson's spray-producer. The inhalations were repeated twice daily. In one of the patients, the experiment was given up at the end of a week, since the man's state commenced to grow worse from the very beginning, and fever, steadily increasing bronchitis, and hæmoptysis had developed. Three other patients died under the treatment, one after fifteen days' inhalations, another after seventeen days, and the third after twenty-five days. The remaining two patients left the hospital after treatment for seventeen and fifty-two days respectively. In none of them was anything like a diminution of the expectoration observed. In one of the fatal cases, shortly before death, the sputum became more profuse, more liquid, and assumed a characteristic bad odor, resembling that of a pure culture of the bacterium termo. At the necropsy, numerous excavations "represented, as it were, a culture of the bacterium;" the spleen was enlarged, flabby, partly of a dark red, partly of a pale red color; the liver was also enlarged and anæmic. In the non-fatal cases, nothing like a diminution or disappearance of the tubercle bacilli from the sputum was detected. In the patient who was treated by the inhalation for more than seven successive weeks, the number of bacilli was distinctly increased during the seventh week. In none of the cases was any influence exerted by this treatment on the temperature, or perspiration, or the body-weight discovered. Finally, Dr. Filipovitch came to the general conclusion that "no good whatever may be expected from the treatment of tuberculosis by the inoculation of the bacterium termo;" while some of his cases seemed to point out that the infection of the human system with the putrefactive bacteria might prove not nearly so harmless as had been alleged.

CURE OF RHEUMATIC TETANUS BY PILOCARPINE.—BRÜNNER describes the case of a peasant woman aged forty, suffering from rheumatic tetanus, whom he treated for five days without result, despite the administration of morphia, chloral, quinine, etc. Pilocarpine was then used in the single daily dose of one-third of one grain. The induced perspiration was moderate, but the increased salivary secretion was very great. Chloral hydrate was given at night. On the ninth day of treatment the convulsions disappeared completely.—*Centralb. f. klin. Med.*, September 18, 1886.

CLINICAL EXAMINATION OF URINE IN CHILDREN'S DISEASES.—In the preliminary note in the *Vratch*, Nos. 44 and 45, 1885, p. 730, Dr. Alexandra J. Eckert, house-physician to the Elizavetinskaia Infirmary for Children, in St. Petersburg, states that she had made 1500 analyses of urine in 104 children, in order to study its changes under the influence of various affections attacking the child's organism, and to determine quantitatively the albuminoid losses sustained by the system in febrile albuminuria. The albumen in the urine was estimated after a method based on Heller's test, and introduced simultaneously by Professor Roberts, of Manchester, and Dr. J. J. Stolnikoff, of St. Petersburg (see Professor V. A. Manasseïn's *Sbornik Rabot*, Part II., 1877). The author divides her cases into four groups.

The first group consists of the following cases—*a. Typhus fever* (seven cases in children, aged from 6 to 15). During the febrile period the urine was scanty, highly colored, and of a high specific gravity; in five of seven cases albuminuria, lasting from four to twenty-one days was present, the quantity of albumen varying from 0.024 to 0.502 per cent. It rapidly disappeared with the advent of pyrexia. *b. Enteric fever* (nineteen cases in patients aged from 3 to 14). In fourteen of them albumen was found during the febrile period for four to fourteen days, its quantity varying from mere traces to 0.7 per cent. *c. Relapsing fever* (two cases, aged 8 and 11). No albuminuria was observed. *d. Intermittent fever* (three cases, aged 9 to 12). No albuminuria was found.

A second group included—*a. Croupous pneumonia* in twelve patients, aged from 8 months to 12 years, with scanty, highly colored, and very dense urine during the febrile stage. In ten of them from a mere trace to 0.104 per cent. of albumen was found at the time of high temperature, for four to seven days. *b. Catarrhal pneumonia*, in two patients, aged 7 and 8. In the former, who had fever of an intermittent type and ultimately recovered, no albumen was found in his scanty urine of a high specific gravity. In the other, 0.064 per cent. of albumen appeared shortly before his death. *c. Pulmonary tuberculosis.* In all four fatal cases (in children aged 2½ to 10) albuminuria was present, varying from traces to 0.84 per cent. *d. Chronic pneumonia* (one case) and *exudative pleurisy* (one) without albuminuria.

A third group is composed of—*a. Measles*, two cases, aged 3 and 10, with albuminuria of one to three days' duration; the amount of albumen varied from 0.012 to 0.067 per cent. *b. Diphtheria*, faucial; two cases, aged 6 and 10, with albuminuria of one to five days' duration,

varying from 0.024 to 0.144 per cent. *c. Scarlet fever*, six cases, aged 3½ to 8. In five, albuminuria was observed, and that in two forms—as a *febrile* one, during breaking out of the rash, of one to seven days' duration, and with 0.012 to 0.044 per cent. of albuminuria; and as a *nephritic* one in the third week of the disease, of a monthly or longer duration, with 0.012 to 0.244 per cent. of albumen. *d. Parenchymatous nephritis*, eight cases. In seven, albuminuria of one to six weeks' duration was found, with 0.024 to 0.164 per cent. of albumen.

The fourth group consists of—*a*, a case of *catarrhal angina with erysipelas*, no albumen; three cases of *tonsillitis*, 0.052 per cent. of albumen in one; and four cases of *intestinal catarrh*, 0.052 to 0.184 per cent. in one. *b. Non-febrile internal diseases*—scurvy, aortic stenosis, anæmia, cerebral tumor, dyspepsia, chorea, icterus, etc., seven patients, aged 5 to 14. Only in a case of syphilitic interstitial hepatitis were some traces of albumen noted. *c. External affections*, in twenty cases, aged from 9 months to 16 years. No albumen was detected in femoral phlegmon, in eczema with nettle-rash, in a case of femoral osteotomy, in fracture of the femur, and in rheumatic synovitis of the knee. Albumen was present in a fatal case of extensive burn, 0.184 per cent.; of multiple lymphoma, 0.064 per cent.; rachitis with bedsores, 0.008 to 0.124 per cent. It was observed also in three of eight cases of caries, in quantity varying from traces to 0.024 per cent. Finally, albumen (from 0.024 to 0.244 per cent.) was detected also in three cases of vesical stone and cystitis, its source being of course not in the kidneys.

The general conclusions reached by the diligent author are given as follows: 1. All affections considerably disturbing nutrition of the child's system, and running their course in association with a high febrile state, give rise to albuminuria in an overwhelming majority of cases. 2. The characteristics of albuminuria are usually dependent upon the intensity of the morbid process, and the duration of the febrile period. 3. As a rule, albumen rapidly disappears after abatement or cessation of fever. 4. Non-febrile affections, as well as those accompanied only by slight fleeting febrile movements, seldom give rise to albuminuria of any considerable degree; and when they cause albuminuria, it occurs only as a phenomenon of very short duration.—*The London Medical Record*, Oct. 15, 1886.

STRYCHNIA IN DIPSOMANIA.—The treatment of various forms of the alcoholic habit by means of strychnine, which has been recommended from theoretical and clinical researches by Luton, Giacomini, Magnus Huss, Morey, Lecuyé, Jaillet, Minoz, Dujardin-Beaumetz, and Amagat, has recently been tried by some Russian practitioners, and found to give gratifying results. DR. POPOFF, writing in the *Vratch* (No. 10, 1886), after giving a *résumé* of the results obtained by the French and Italian observers above named, mentions some cases of dipsomania which he had successfully treated in the same way, and in the last number of the *Vratch* (No. 38), DR. K. K. TOLVINSKI describes the case of a man, aged thirty-four, belonging to a neurotic family, very anæmic, but with no organic disease, who had drunk hard for many years, and with whom of late the outbreaks had been as frequent as two or three every month. He was treated with chloral, bromide of potassium, and opium, with but little success, his extreme distress, desire for drink, nausea, vomiting, and unusual weakness being unaffected. On the last occasion, when he had been drinking for some days, Dr. Tolvinski decided to make trial of strychnine, and began with the sixtieth of a grain of the nitrate in pilules three times a day, and did not prohibit spirits. The next day the man felt better, and asked for wine; but the sleeplessness, the want of appetite, and nausea and vomiting still continued, though in a somewhat less severe degree. Four days after the commencement of the strychnine treatment the patient had greatly improved in every way, and was soon afterward able to resume his work. He continued to take the sixtieth of a grain twice a day for six weeks, and during the four months which have elapsed since the attack he has had no inclination for drink. Upon this case the editor of the *Vratch*, PROF. MANASSEIN, who holds the chair of Special Pathology and Therapeutics in the Imperial Military Academy at St. Petersburg, remarks: "There is no doubt that, with abundant materials at hand, observations on the effect of strychnine on different forms of alcoholism will in the immediate future be accumulated in considerable numbers. It may be desirable as a preliminary to distinguish the different classes of the affection: (1) Anæmic cases (literally 'white fever'); (2) actual drunkenness; (3) constant drinking without symptoms of chronic alcoholism; (4) chronic alcoholism. It is very possible that the effect of strychnine on these very dissimilar conditions may be different, and if all these forms are confounded together, as is done by many writers, it can only lead to confusion when the strychnine treatment is mentioned." Prof. Manassein goes on to relate the case of a cook, an honest, respectable woman of forty-five, who was subject to attacks of insuperable craving for drink, which attacks were preceded by a depressed and highly irritable condition. They gradually increased in frequency, so that latterly they came on about every fortnight. Sulphate of strychnine was ordered in pills from the sixtieth to the thirtieth of a grain after breakfast and dinner. During four months of the strychnine treatment the patient continued in excellent health, not only having no outbursts, but not even experiencing any inclination for drink.

In another Russian medical journal, the *Meditsinskoe Obozrenie*, DR. PARTSEVSKI gives an account of nine cases of acute and chronic alcoholism treated by means of hypodermatic injections of strychnine. Seven of the cases gave excellent results, but in the remaining two cases the strychnine had to be discontinued and chloral substituted. In the majority of cases the treatment began to take effect very quickly on the appetite, sleeplessness, and hallucinations. The trembling of the hands, too, entirely disappeared, and the general irritability subsided. The author says that under no other kind of treatment has he found patients recover so quickly from an attack. Even the blueness of the skin and the puffiness of the face and hands quickly disappeared, and the quantity of urine became notably increased. The dose given is not very clearly stated, but the number of injections required in the different cases was usually from four to eight. In only one case were fifteen necessary. They were given twice a day.—*The Lancet*, October 16, 1886.

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SATURDAY, NOVEMBER 6, 1886.

CEREBRAL SURGERY.

ON November 25, 1884, MR. RICKMAN J GODLEE removed a glioma, the size of a walnut, from the ascending parietal convolution, where its presence had been localized by Dr. A. Hughes Bennett. The abundant hemorrhage was arrested by the galvanic cautery, and the edges of the superficial wound were approximated by sutures. The patient progressed well for thirty-one days, despite the formation of a hernia cerebri, when he was suddenly seized with a rigor and symptoms of cerebral inflammation, and died precisely four weeks after the operation, the fatal issue being due to a local meningitis, which, as admitted by Mr. Godlee, was the result of putrefaction from want of proper attention to antiseptic precautions.

About a year prior to the operation of Godlee, DR. WILLIAM MACEWEN, of Glasgow, cut into the ascending frontal convolution toward the paracentral lobule, and evacuated a broken-down gumma. The patient made a rapid recovery, and was able to attend to her household duties at the end of two months. Both cases demonstrated, first, that small, as well as large, lesions can be accurately located, and, secondly, that incisions into the motor area not far removed from the cortex can be made, with as much prospect of success as incisions into other organs or tissues, provided a vital spot is not injured,

As the natural outcome of the reports of these cases, and of still further recent advances in cerebral localization—a study with which the names of Hughlings Jackson and Ferrier are conspicuous—the profession was led to anticipate a great future for brain surgery. That these hopes have been fully realized will become apparent after a perusal of a paper read at the late meeting of the British Medical Association, at Brighton, by MR. VICTOR HORSLEY, and published in the *British Medical Journal* for October 9th. In this communication that surgeon gives the details of three successful operations upon the motor area of the brain. In one of these a small tubercular tumor, along with more than half an inch of the surrounding cerebral tissue, was removed, and five-sixths of the external wound healed by the first intention in a week. In a second case, one of epilepsy, a mass of cicatricial tissue and the adjacent brain substance were excised, and the wound was firmly united in seven days; while in the third case, also one of epilepsy, fragments of bone and a wedge-shaped cavity were removed, and the wound was completely healed in four days.

In addition to these cases, Mr. Horsley, on September 23d, successfully extirpated from the motor region of the right hemisphere a tumor which weighed four and one half ounces, was three inches long, two and one-half inches broad, and two inches deep. The wound had closed in four days.

These brilliant operations demonstrate the comparative harmlessness of trephining the skull and incising or cutting out the brain tissue under antiseptic precautions, as well as the great value of the scientific application of facts derived from experimental researches on the cortex of monkeys to operations on man. Indeed, Mr. Horsley states that the repair of wounds in the lower animals does not differ from that in the human subject, and that the stereotyped views on this subject, namely, that safe deductions cannot be made from one to the other, are utterly groundless, and have done much to hinder the progress of brain surgery.

It is impossible, in the limits of this article, to discuss the various symptoms which led Mr. Horsley to locate the lesions which he so successfully attacked, so that we shall limit ourselves to describing his method of operating, as a future guide to practical surgeons, particularly as it differs in some important points from the practice ordinarily pursued.

On the day before the operation the head is shaved and washed with soft soap, and then with ether, after which the position of the lesion is ascertained by measurement, and marked on the scalp. The head is then covered for twelve hours with lint soaked in a five per cent. carbolic solution, oiled silk, and cotton-wool. On the previous evening a purgative is administered, and followed by an enema on the morning of the operation.

Ether is rejected, unless there is a heart-complication, on account of its tendency to cause cerebral excitement. Before administering chloroform, a quarter of a grain of morphia is thrown under the skin, with the double object of diminishing the

quantity of the anæsthetic used in the operation, and of inducing contraction of the arterioles of the brain, through which important action of the drug the incisions into the cortex are accompanied by very little oozing.

Strict antiseptic precautions are, of course, observed throughout, and Lister's original plan as to the agents employed and their manner of application is preferred, although sublimate wool, the skin being protected by carbolic gauze, may be used.

The incision through the superficial coverings of the skull is semilunar, and so planned as not to divide the main arterial trunks supplying that portion of the scalp. The periosteum, on the other hand, is reflected by a crucial cut from an area corresponding to the first trephine-hole, and subsequently as more bone is removed.

In cutting away the bone a hole is made with a trephine, two inches in diameter, at each extremity of the area to be excised; the sides of the area are then divided through one-half the thickness of the bone with a Hey's saw; and the section is completed with a strong cutting forceps. If it be possible to preserve the dura mater intact, the buttons of bone should be preserved in warm aseptic sponges, and be placed, after having been divided into small fragments, between the dura mater and the skin, as originally practised by Macewen, to insure osseous repair of the loss of substance.

In connection with the removal of the bone, we may call attention to an important fact pointed out by DR. W. HALE WHITE, in *Guy's Hospital Reports*, vol. xliii., 1885. In the post-mortem examinations which he made of subjects dead of tumors of the brain, he found almost invariably that the bones of the vertex were very light and thin, although quite hard, the thinness in extreme cases being the same as that of cardboard. Hence, in using so large a trephine as that recommended by Horsley upon so uneven a surface as the calvaria, the atrophied condition of the bones should be borne in mind, lest the cranial contents be injured.

The dura mater is incised around four-fifths of the circumference of the area exposed at one-eighth of an inch distant from the edge of the wound of the bone, in order that its edges may afterward be sutured. The incision is begun with a scalpel and finished by blunt-pointed scissors, great care being taken not to wound the subjacent membranes. The main branches of the middle meningeal artery are secured by ligatures passed through the dura mater just outside its cut edge.

After the incision of the dura mater the brain bulges into the wound. The existence of a slight yellowish tinge, or of lividity, will indicate the presence of a tumor beneath the cortex in the corona radiata. In removing the morbid growth the incision is made exactly vertical to the surface, or parallel with the course of the arterioles, and directed, when necessary, into the corona radiata in such a way as to prevent damage to the fibres coming from the cortex, and surrounding the seat of the operation. All bleeding vessels are ligatured.

After the removal of a portion of the brain, there is not left, as one would suppose, a gap with vertical sides, since the floor of the gap bulges almost to a level with the surrounding cortex. In addition, the cut edges become slightly everted, and they are extruded into the opening in the skull if less brain than bone is removed. In other words, there is a tendency to hernia cerebri, and it is for this reason that the semilunar flap of the scalp, when united, offers sufficient resistance to the upward pushing brain, while the point of meeting of the four angles of a crucial incision never does. All oozing having been arrested by gentle pressure with a soft sponge, a drainage tube is inserted into the most dependent portion of the wound, and the latter closed with silk sutures inserted at distances of two-fifths of an inch, and, between these, horsehairs. During the first twenty-four hours there is a steady oozing of blood and serous fluid, but at the end of this time the tube is removed, and the wound carefully dressed, firm but gentle pressure being made over the centre of the flap. At the expiration of five or six days, the wound may be covered with a little powdered boracic acid, cotton-wool, and collodion; and the stitches may be removed at any time after the first week.

With the single exception of the antiseptic agent used by Mr. Horsley, we consider that his plan of operating in all its details is most judicious. The exhibition of morphia and the employment of ligatures for the prevention and arrest of hemorrhage, instead of the galvanic cautery resorted to by Godlee; the semilunar superficial flap, which can be laid down like the lid of a box; the suturing of the dura mater; and the early withdrawal of the drainage tube are rules which are in perfect accord with the guiding principles of the management of wounds elsewhere. The short period of drainage is the one point regarding which he will probably be unfavorably criticised. His reasons, however, for this action are, to us, conclusive. He states that he wishes to obtain a certain amount of tension of wound-exudation within the cavity. First, because it reduces the tendency to hernia cerebri; secondly, because it compels the lymphatics to remove the fluid, thereby facilitating primary union of the skin wound; and, thirdly, because it acts as a kind of scaffold for the building up of a non-inflammatory connective tissue by which the brain is separated from the flap of skin. Whether or not these reasons be generally deemed sufficient for the course he pursues, it must be re-

membered that all of his cases have terminated favorably, and that it will be best to follow him in this particular until increasing experience leads us to modify the practice.

THE EXTRACTION OF THE AFTER-COMING HEAD.

FROM time to time, during the past few years, an animated discussion has arisen in the German medical press, as to the comparative merits of manual and instrumental extraction of the after-coming head in breech presentations, and after turning, especially in cases of contracted pelvis. Credé has been the foremost advocate for the use of the forceps, while Schröder and his followers condemn this practice, and recommend manual extraction alone.

In a recent number of the *Berliner klinische Wochenschrift*, A. MARTIN declares himself also in favor of manual extraction; but, appreciating the danger to the child which undoubtedly attends the present manner of applying this method, he proposes a modification which he has practised in thirty-eight cases with very good results. Instead of the usual method of placing the finger of one hand in the child's mouth, and hooking the fingers of the other over its shoulders and then pulling vigorously, throwing all the strain on the lower jaw and cervical vertebra, Martin's plan is to introduce the middle finger of the hand, the palmar surface of which corresponds to the abdomen of the child, into the mouth, and make moderate traction upon the lower jaw, while the other hand is used to make powerful pressure upon the child's head externally and from above. Of thirty-eight children extracted, or rather expressed in this manner, seven, or eighteen per cent., were stillborn, a result better than that obtained by the forceps in the hands of Credé himself, who reports in the *Archiv für Gynäkologie*, Band xxv., sixteen cases, of which number four, or twenty-five per cent., were stillborn. In view, therefore, of the comparatively good results achieved, the wish expressed by Martin that the profession may at least deem this method worthy of trial will probably be gratified.

FRAUDULENT OPIUM CURES.

AMONG the many calls for sympathy occurring in a doctor's practice, few have a more valid claim than those of the unfortunate victims of the opium vice. The dose taken at first to alleviate pain gives relief so perfect, that if the suffering be due to chronic disease, the dosing, too, is almost sure to become chronic. The narcotic habit, with its attendant perversion of physical function and moral control, is accepted as the lesser evil. With the sense of moral obligation blunted, and the power of self-control impaired, the slave to opium drifts at the mercy of circumstances. But at some conjuncture the will is prompted to a decided effort to regain control, and he who can reinforce this resolution and tide the drifting man to solid ground is a benefactor indeed. Such recoveries have been made, but only through abstinence maintained by personal restraint, and supplemented by a supporting regimen of food, sleep, tonics, and, when necessary, stimulants. The man who would take advantage of the struggling opium victim at such a time, and, under the pretence of helping, only hold him longer in the stream, is deserving of most severe punishment.

This is the very offence of which nineteen persons are guilty, according to the recent report of the analyst to the Massachusetts State Board of Health, and some of the names given are not unfrequently found in the advertising columns of medical journals. Twenty samples of widely advertised opium "cures," including Baker's, Beck's, Collin's, H. H. Kane's, and others less known, were examined and all but one were found to contain morphine. The exception was "Keeley's Double Chloride of Gold Cure," which is exorbitantly expensive on account of the alleged presence of the precious metal, but which contained neither morphine nor gold.

The dupe of these so-called antidotes simply pays a higher price for his opium than he has hitherto done, the difference being the profit of the fraud. To crown the infamy of this business, the advertising circulars give endorsements which are in many cases published without the least shadow of authority.

The Journal of Comparative Medicine and Surgery, now in the seventh year of its existence, has just transferred its publication office to Philadelphia, and its last number appears in an enlarged form, and with marked evidence of improvement in every department. Dr. Huidekoper, of the Veterinary Department of the University of Pennsylvania, has joined Dr. Conklin on the editorial staff, and a number of our leading teachers of comparative medicine have consented to act as collaborators. The *Journal* is one in which the general practitioner will also find very much of interest. A glance through the present number shows a series of valuable original communications. The beautifully illustrated article by Mr. Bland Sutton, on "Tuberculosis in Birds," is of special value, and illustrates the wide zoölogical distribution of this fatal disease, which appears to be identical in birds and mammals.

During the past twelve years the veterinary profession of this country has developed rapidly, and the public is beginning to recognize its power and usefulness. Such an organ as the *Journal of Comparative Medicine* will represent its best interests, and deserves the support of all who would see this branch of the profession take its rightful position in the community.

OUR readers will remember the Dwight life insurance case, which was some time ago the subject of discussion in THE NEWS, and in which the decisions of the jury and the lower court were in favor of the family of the insured. Within a few days, the final court of appeal in the State of New York has given its decision, in which it affirms that the lower court was in error in not granting to the defendants—that is, the Germania Life Insurance Company—a nonsuit. The trial is, therefore, set aside. Whether there will be any further proceedings in the case is, of course, uncertain; but, so far as the Germania Life Insurance policies are concerned—*i. e.*, those which were especially in question at the trial—the affair is definitely settled against the family.

THE Louisiana State Board of Health on Sunday revoked the quarantine against all of Harrison County, Mississippi, except the town of Biloxi, which still remains under the ban.

THE German physicians of Philadelphia propose to organize "Der Deutsche Medicinische Verein von Philadelphia."

REVIEWS.

THE MEDICAL NEWS VISITING LIST FOR 1887. Philadelphia: Lea Brothers & Co., 1886.

THE MEDICAL NEWS VISITING LIST for 1887 has just been issued. In addition to the visiting list proper, it contains upward of fifty pages of memoranda, which are most useful to the practitioner in emergencies, such as a list of poisons and antidotes, rules for disinfection, for artificial respiration, a table of doses, a therapeutic table, lines for the ligature of arteries, a list of incompatibles, etc. A new and useful feature is the celluloid memoranda leaf, which is as flexible as paper, and pencil marks can be erased from it with rubber or moisture. The whole is handsomely bound in red seal leather with patent thumb-letter index for quick reference, and is of convenient size and weight for pocket use. The aim has been to make it an indispensable volume to the busy practitioner.

SOCIETY PROCEEDINGS.

NEW YORK SURGICAL SOCIETY.

Stated Meeting, October 11, 1886.

DR. L. A. STIMSON IN THE CHAIR.

DR. WM. T. BULL reported

TWO CASES OF ABDOMINAL SECTION FOR PENETRATING GUNSHOT WOUND OF THE ABDOMEN,

giving the history of the cases, and presenting his last patient before the Society. The first case proved fatal, and the operation was only performed to prevent a serious hemorrhage of the liver which was the result of the injury. The histories of these cases were as follows:

CASE I. *Wound of Liver; Laparotomy; Death after Operation.*—A clerk, fifty-seven years of age, of intemperate habits, shot himself in the abdomen, with a pistol of 32 calibre, about 9 A. M. on Jan. 10, 1885, and was brought to Chambers Street Hospital by ambulance two hours later. On admission he was suffering from shock and loss of blood, the surface of the body and extremities was cold and very pale, the pulse 100 and feeble, resp. 24, and temp. 94° (axillary). He was rational but dull; had vomited once the contents of the stomach, and had little or no pain. In the epigastric region was the entrance wound of the bullet, three inches above the umbilicus, and one and three-quarter inches to the left of the median line. The wound of exit was in the right side in the axillary line midway between the ribs and crest of ilium. There was no bleeding from either wound. Urine drawn was normal in appearance. Four hours later, notwithstanding every effort, his condition was worse: pulse (temporal) 134, resp. 28, temp. 97°. Seven hundred and fifty cubic centimetres of saline solution were infused into the cephalic vein in the course of twelve minutes. This was followed by improvement, and at the expiration of three hours the radial pulse was 112, of fair volume, resp. 24, temp. 96¼°. At 9.30 P. M., after consultation with Dr. Weir, I performed abdominal section. It was just seven and three-quarter hours after admission, and the general condition had undergone no decided change from that noted three hours after the infusion. From the situation of the two wounds, and the evident signs of hemorrhage, I inferred that the liver had been wounded, and undertook the operation in the hope of arresting the bleeding. The incision was made from an inch below the ensiform cartilage to three inches above the pubis, and showed at once that the bullet had entered the left lobe of the liver, cutting it nearly in two (transversely). The intestines were floating in bloody serum and clots. A few loops of uninjured intestine were drawn out in order to expose the right lobe of the liver, and the blood rapidly sponged out, but it welled up from beneath the liver as fast as it was removed. The pulse began to fail after the abdomen was opened, and before the cavity had been cleared so as to allow a satisfactory inspection, the patient expired, just half an hour from the time the administration of ether was begun. There were no other visceral wounds. The bullet had traversed the left lobe, as described, then passed through the round ligament, the lower edge of the right lobe and the abdominal wall. The vessels in the transverse fissure escaped injury.

CASE II. *Gunshot Wound of Intestine and Mesentery, with Hemorrhage; Laparotomy, with Suture of Intestine; Recovery.*—Daniel Mahoney, aged twenty-five years, sailor, was brought to the Chambers Street Hospital in a cab, August 12, 1886, at 7.40 P. M. He came into the reception-room without assistance, complaining only of pain in the abdomen while walking. Twenty minutes before, he had been shot during a friendly scuffle, with a pistol of 38 calibre. He was slightly pale, and was perspiring freely, and since the injury had felt some nausea, but had not vomited. The axillary temperature was 97°, pulse 96, full, resp. 26. The abdomen was normal to sight and touch, but for the presence of a bullet wound two inches below and two inches to the left of the umbilicus, in the vicinity of which it was tender on pressure. The skin about the wound was normal, the edges were blackened, and the lumen occupied by a clot of dried blood. The trowsers,

just below the waistband, and two shirts, were found to be pierced by the bullet, no trace of which could be found under the skin of the trunk. The urine was drawn: it was free from blood. Rectal examination was negative. After washing the skin thoroughly, the wound was covered with a compress of iodoform gauze and absorbent cotton, and gr. ⅛ morphine administered hypodermatically. The man had always been in good health, drank only occasionally, and was of excellent physique. The dangerous character of his wound was explained to him; and he consented at once to an operation.

Two hours later his condition was as follows: pulse 104, resp. 24, temp. 98°; no pain; slight rectal tenesmus; abdomen unchanged. A probe could not be introduced beyond the muscular layer. Hepatic dulness normal. No emphysema about the wound. He had made an ante-mortem statement to the coroner, and been visited by several friends. At 9.40 P. M. ether was administered by Dr. Tiernan; the operation begun fifteen minutes later. The wound was explored by an incision three inches long, and found to pass directly backward through the rectus muscle. The incision was then made in the median line from the umbilicus to the pubes. Coils of small intestine came at once into view. They were bathed in odorless, bloody serum, several ounces of which escaped from the cavity. As the general condition did not indicate any serious hemorrhage, I proceeded to examine the intestine without waiting to sponge out the cavity. About half the length of the small intestine was drawn out, rapidly sponged, inspected, and placed under warm towels, before a wound was discovered. Then a loop was met *through* which the ball had evidently passed. The wound on one side was evidently that of entrance (Fig. 1). It was as large

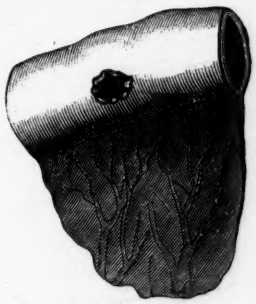
FIG. 1.

First perforating wound of small intestine.

as the top of a lead-pencil, its edges adhering, without prolapse of the mucous membrane. The other, directly opposite, and midway between the free and attached border of the gut, was twice as large, with a little fold of mucous membrane occupying its lumen (Fig. 2). There was no escape of feces. The gut was held up by an assistant, a sponge placed beneath each wound, and the abdominal incision protected by a large flat sponge, while the sutures were inserted after Lembert's method. The finest iron-dyed silk was employed. Three sutures sufficed for the first, and six for the second wound. Iodoform was rubbed along the line of suture.

Several more feet of small intestine were examined without finding any other signs of injury than half a dozen subperitoneal extravasations of blood, no greater

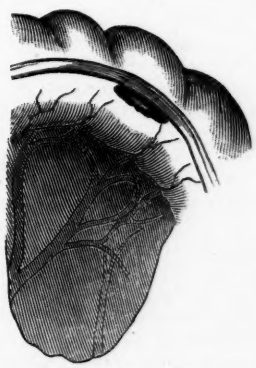
FIG. 2.



Second wound (of exit) opposite the preceding one.

in area than a pea. The mesentery was *dotted* with smaller extravasations. There was no decided congestion of the gut, nor any lymph exudation on its surface. The pelvis was then occupied by one or two coils of small intestine and the sigmoid flexure, while the cæcum projected from the right side, partly obscured by the small intestine. To examine the rest of the gut, I removed with the hand and sponges at least two tumblerfuls of clotted blood. It was then evident that there was hemorrhage from some vessel deep in the pelvis. It was not very active, for the pressure of a large sponge controlled it. All the small intestine that could be drawn out was then held under towels outside the wound, and the sigmoid flexure also exposed to view. A longitudinal wound, half an inch in length, was met with close to its attached border. The muscular coat was bared, but no mucous membrane was seen. (Fig. 3.) This wound

FIG. 3.

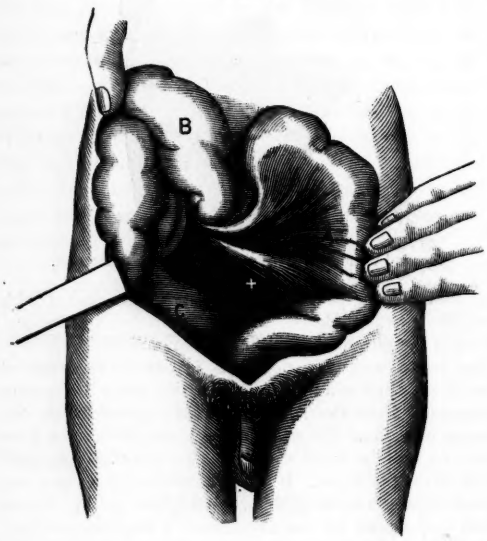


Third wound of sigmoid flexure. Perforation uncertain.

was closed with four sutures. The cæcum was now pushed out of the way, and a view obtained of the sigmoid mesocolon, and the source of the bleeding discovered to be a circular wound near to its attachment to the middle line, and fully three inches from the top of the gut. (Fig. 4.) When the mesocolon was made tense by traction on the flexure, the bleeding ceased; when relaxed, a stream of venous blood issued from the wound so copiously as to fill the cavity of the pelvis one-

third full several times before it was controlled. Pressure below the wound stopped it, but the vessel from which the blood issued could not be seen even after the wound was enlarged with scissors. The tissues on the

FIG. 4.



The sigmoid flexure drawn out, showing the situation of the two wounds of the mesocolon, *A* the superficial one involving the peritoneum only, † the deeper one, which was the source of hemorrhage.

lower edge, when pressure was effective, was finally grasped in a large "bite" with long artery clamps, a silk ligature passed by means of a curved needle under the blade of the forceps, and tied as the forceps were withdrawn. This controlled the bleeding. Above, and to the inner side of the wound, there was an extravasation of blood, which, as it was firmly clotted, was not interfered with. Another wound of the mesocolon stripping off its peritoneal coat over an area as large as a quarter-dollar was found close by. (Fig. 4.) This, and the preceding one, were not sutured, but rubbed thoroughly with iodoform. One of the appendiculæ epiploicæ, of good size, was found torn and bleeding at its extremity. It was tied at its base with catgut and cut off.

Considerable blood had been observed to come into the pelvis from the region of the cæcum, during the efforts to stop the hemorrhage already referred to, but on careful sponging there was found no fresh source of bleeding. A sponge in the grasp of a long forceps was passed into both lumbar and epigastric regions, and brought out perfectly clean. The omentum had not been seen up to this time, but the sponge drew it out from the left lumbar region, and its extremity being found lacerated (but not bleeding), was tied to the extent of three inches with silk and cut off. The rectum was again examined with the finger, and the bullet not being found there, I concluded that it was lodged in the extravasated blood in the mesocolon, and decided not to search for it further. Several pints of warm carbolic acid solution (about 1 to 100) were poured from a pitcher into the pelvis and sponged out, and the intestines, as they were replaced, freely washed with the same solution. The abdominal wound was sutured with silver wire, and silk sutures passing through all the layers with superficial catgut sutures; and a continuous catgut suture was applied to the peritoneum. Iodoform gauze covered the line of suture, and over this a compress of carbolized gauze, with a metallic coil (Leiter's) held in place by a binder. The incision into the bullet wound was stuffed lightly with iodoform gauze.

The duration of the operation was one hour and fifty minutes. The intestines were held outside the cavity just one hour, and thirty minutes were spent in applying the sutures. Ether was given for two hours and ten minutes. The pulse at the end of the first hour was 116, at the close of the operation 128, and of fair volume. The extremities were cold, but respiration was satisfactory. Four subcutaneous injections, each of whiskey ʒj, and tinct. digitalis ♏x, were given in the last hour.

Dr. Bull considered himself fortunate in having the advice of Professor J. D. Bryant, who agreed with him as the propriety of the operation, and the assistance of Drs. C. H. Wilkins, B. Farquhar Curtis, Garrison, Parke, Treniard, and Bryant, of the house staff. Drs. J. Robert Eustice and John P. Adams also rendered valuable help. The room was not specially prepared for the operation. It is used for out-patients during the day. But in other respects the utmost attention was given to antiseptic details. The sponges were taken from a five per cent. solution of carbolic acid, in which they had been lying for two months, and rinsed in warm two and a half per cent. solution. During the operation they were washed in a much weaker—about 1 to 100. All the silk employed I boiled myself in a five per cent. solution for half an hour previous to the operation. The towels employed were old ones, which had been washed in a two and a half per cent. solution, and were kept warm with a weaker one.

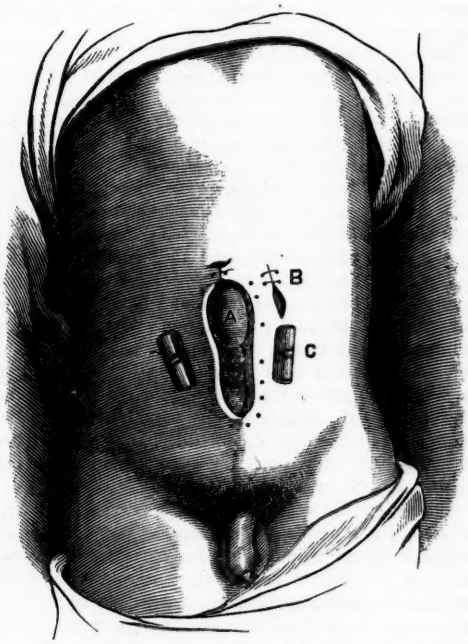
August 14. 10 A.M.; pulse 108, resp. 34, temp. 100°. Thirty-six hours after operation, reaction was prompt, and ice water was run through the coil twelve hours later, and is now continued. Magendie's solution ♏ xxxij, has been given subcutaneously in five injections; ice by the mouth, and by rectum five enemata of beef peptonoids ʒiijss, and whiskey ʒss. During the last twelve hours he has been allowed champagne ʒij, or milk and lime-water ʒij, every two hours. He has dozed most of the time; complained of a little pain. There is slight tympanites. He is troubled with occasional cough with slight mucous expectoration. Urine drawn by catheter has amounted to ʒxx; it is high-colored and contains urates but no albumen; specific gravity 1.020. 10 P.M.: pulse 98, resp. 26, temp. 100°. Tongue is moist and there has been no nausea.

17th. Fifth day. 9 A.M.: pulse 80, resp. 24, temp. 101°. Up to this time the progress of the patient has been uneventful. There has been slight pain and tympanites; no nausea or vomiting. Liquid diet has been given and occasional doses of morphine hypodermatically. The cold water coil has been continued, though the temperature has not been over 100½°, or the pulse over 100. A copious normal but soft fecal evacuation took place after an enema. A purulent collection in the wound made itself evident by discharge about the sutures. The line of union which was firm,

was broken down and a thin layer of pus found at the bottom in the extra-peritoneal tissue. But in the upper half of the wound the peritoneum along the line of suture was sloughy, and on parting its edges a portion of intestine was visible, firmly adherent to the parietes. I mopped out with a two and a half per cent. carbolic acid; stuffed lightly with iodoform gauze. The pulse, respiration, and temperature were normal after this.

18th. Sixth day. While coughing in the night a piece of gut protruded from the upper third of the wound, but did not overlap the skin. Its surface was coated with grayish lymph, with granulations in places. The wound was five inches long and two inches wide. The

FIG. 5.



Appearance of the wound on the eighth day.
A. Protruding intestine.
B. Bullet wound.
C. Silver-wire suture secured with pieces of wood.

edges were held together with two "relaxation-sutures" of silver wire, and compression made on the intestine with a small pad of iodoform gauze and wool. (Fig. 5.) By means of this the gut was pushed back from day to day, while the edges being were drawn together and the lower part of the wound was filling with granulations. On the ninth day solid food was allowed. On the eighteenth day the intestine was on a level with the rest of the wound. The whole surface (3¾ inches long by ⅝ inch wide) was granulating finely. Skin grafts were put on several times. Balsam of Peru replaced the iodoform, and at the end of eight weeks cicatrization was complete. It is now only a week that he has been out of bed.

Dr. Bull thought his cases demonstrated the utility of the operation in preventing shock, which means loss of blood. He thought we had no satisfactory means of dealing with serious internal hemorrhage without resorting to laparotomy. He mentioned those cases published by Dr. Dennis as also showing the necessity of an early operation in this class of injuries.

The patient was then brought before the Society and his abdomen exposed, showing the cicatrices and line of incision, with entrance point of the bullet. The illustrations exhibited were made from the cadaver, which was placed in a position to represent that of the patient when he was shot.

He thought we should devise some satisfactory method of recording the unsuccessful cases as well as the successful ones; he had added one to the list of the former to-day, and he did not know of more than five or six such cases which had been published. He also believed it best, in gunshot wounds of the abdomen, to explore the wound to see if it be penetrating or not, and, if it be penetrating, to perform abdominal section and repair the injury if possible. He believed, however, that at present there are only three successful similar cases on record.

DR. MARKOE asked if he understood there were only three successful cases published.

DR. BULL replied that that was all he had been able to verify.

DR. LANGE stated that there had been a case reported to him, lately, by a country practitioner in Germany, but he was not certain whether it had been published in the medical journals, as the case was sent to him in pamphlet form. He then asked what was the calibre of the bullet in Mahoney's case.

DR. BULL replied that it was thirty-eight calibre, and in the fatal case thirty-two.

DR. STIMSON asked whether the wound of the mesentery was simply an abrasion.

DR. BULL replied that the peritoneum was stripped off and lost.

DR. ABBE thought that the absence of fecal contamination was of some importance in this case, and that it was a favorable point in preserving the patient from shock.

DR. MARKOE asked whether there was any fecal extravasation in the first case, and if he incised the wound to start with.

DR. BULL replied no, to both questions.

DR. BRIDDON asked whether he would advise exploration in all wounds of the abdominal cavity.

DR. BULL thought it would be generally admitted that no such rules can be applied to every case; each one must be treated on its being examined by the surgeon; but he thought that if the operator waits until serious peritoneal symptoms set in, he stands less chance of success than if he had operated earlier. He therefore thought it desirable to make an early exploration, and if it be properly made it will not be injurious. If there be blood in the cavity an exploration should be made at once, and if the intestine is found to be injured laparotomy should be performed.

DR. WYETH asked Dr. Bull whether he attached much importance to emphysema of the intestines.

DR. BULL replied that he had never seen it and never thought of it until Dr. Dennis read his paper; but since then he had seen it in two cases.

DR. WYETH remarked that he had had two cases of extra-peritoneal abscess in which there was emphyse-

matous crackling, and he had found that about nine inches above that point a fecal fistula had been established in the alimentary canal; this condition was very distinct.

DR. STIMSON asked if he had understood correctly that it was an extra-peritoneal abscess which communicated with the intestines.

DR. WYETH replied that it occurred in a case of Pott's disease.

DR. BRIDDON thought it a very uncommon thing, but said that he had seen several cases of emphysematous crackling somewhat similar to the case referred to.

DR. WYETH remarked that he did not see how there could be fecal gas there unless the intestine was perforated.

DR. ABBE then gave the history in brief, of a case of gunshot wound coming under his care in St. Luke's Hospital, which he thought might be of interest to the Society.

CASE I. *Gunshot Wound of the Abdomen with Four Intestinal Perforations, and also One of the Bladder; Laparotomy and Suturing Six Hours Later; Death Nine Hours after Laparotomy.*—G. H., aged fifty-three years, of large physique and very fat, accidentally shot himself on the morning of July 8, 1886, while drawing some article from a low cupboard; he was bending over at the time and drew a small revolver toward him, which discharged its contents into his belly. He walked to another room and from there a distance of two blocks. He was taken to St. Luke's Hospital, reaching there at 11.30 A.M., and was seen by Dr. Abbe at 12 o'clock. There was then slight shock, dulled intellect with depression; pulse was 82; he had vomited once. He complained of rapidly increasing abdominal pain. Tympanites was not marked, but there was a full feeling about the belly. A small bullet wound was discovered in the median line three inches above the pubes; the probe passed at right angles with the surface. Eight ounces of clear bloodless urine were withdrawn by a soft catheter.

Laparotomy was performed at 2.30 P.M. of the same day, the incision extending from two inches below the umbilicus to just above the pubes; cutting through the inflamed peritoneum lined with lymph; this opened up an encysted collection, of about a pint of greenish, watery fluid, somewhat muddy with lymph flakes and feces. It was confined against the abdominal wall anteriorly by the matted intestines, which were already coated with a thick layer of lymph. The fluid came from a coil of small intestine centrally placed, showing two perforations, one near its attached border, the other opposite the mesenteric side; the latter discharged freely the same greenish watery fluid as was in the sac; each inspiration pumped it out in copious jets. The perforation close to the mesentery had its mucous coat everted and seemed plugged up; the fluid was perfectly confined by the lymph barrier on all sides.

On sponging this cavity the wounds of the gut were readily and thoroughly closed by Lembert's suture. No other coils were injured in this space. The intestines were now gently parted, and it was readily demonstrated that there was no general peritonitis, for the portion of each coil facing the inflamed sac was red and heavily coated with lymph, while the free sides were uninflamed and retained their lustre. Another piece of small intestine, wounded by a double perforation from side to side, was found somewhat below the large collection of fluid just described. It also was isolated by excellent plastic adhesions between neighboring coils, and contained a small amount of feculent inflammatory fluid. The involved parts were cleaned, and these two perforations sutured. No other wounds being seen, a rapid and careful survey of the intestine from duodenum to colon was made.

The bowel was passed from the fingers of one hand to those of the other, mostly within the abdominal cavity; warm sponges, dipped in sublimate solution, at once enveloped any coils that escaped. There was no further injury of the bowel. A final inspection of the pelvis showed a perforation of the peritoneum between the bladder and rectum, which in this subject was underlaid by fat an inch thick.

The wound was small and not inflamed. It was evident that no urine or feces had escaped to set up irritation. A probe was passed downward and backward an inch or so, but gave no clew to the direction of the bullet. It seemed probable that the missile had overshot the bladder, and, traversing the rectum, embedded itself in the sacrum. There had been no bleeding into the peritoneal cavity, and the loop of intestine drawn from the pelvis was free from all signs of inflammation. The fifth wound was sutured, and the peritoneal cavity sponged out with care, Dr. McBurney assisting. Sponges were thrust down into the pelvis and about the kidneys, but returned quite as dry as when introduced; showing that no fluid had leaked in during the operation. The pelvis was drained by a Thomas glass tube, emerging at the lower end of the wound, which was otherwise treated as usual. Before leaving the table a soft catheter was introduced into the bladder, and two or three ounces of clear urine drawn. The wounds suggested a small bullet, No. 22.

The patient did not come out from ether well, but remained in a somnolent condition, his breathing being characteristic of pulmonary œdema. He was restless, and had to be tied in bed. Pulse intermittent and not strong. A catheter being passed at 7 o'clock, no urine was found in bladder. He was freely stimulated with whiskey and digitalis, and heart's action greatly improved. A cold water coil was placed over abdomen. At 11 P.M. his pulse could scarcely be felt at the wrist, though it had been fairly good a few moments before. Prompt stimulation brought it up, yet soon afterward he was taken with a short convulsive attack, tossing about the bed, and throwing arms about. He suddenly ceased breathing. Artificial respiration was immediately begun, and an enema of brandy given, which was not retained. He died at 11.15 P.M.

To the above hospital record, Dr. Abbe added that from the time of operation, as he watched him from hour to hour, he seemed to be laboring under the strain of pulmonary œdema; breathing was oppressed, with more and more coarse râles and labored shallow inspiration. This, with semi-coma and suppression (which latter was complete after operation), and finally a fatal convulsion which he saw, led him to assign uræmia as the real cause of death.

Autopsy, July 9, 11.30 A.M.—The body is well nourished; rigor mortis well marked, no œdema. Veins of legs very varicose. There is an incision in the median

line of abdomen extending from a point one inch below the umbilicus to over the symphysis pubis; extending from the lower end of the incision is a large drainage tube. The wound is united by numerous sutures about one-quarter of an inch apart, and by four metal sutures one and a quarter inches apart. Peritoneum is intensely hyperæmic, and contains recently exuded lymph. The peritoneal cavity contains twelve ounces of purulent fluid.

Intestines. There are two wounds in the lower portion of the jejunum, opposite to each other, and carefully sutured; about seven feet above these two wounds are two other wounds opposite to each other and carefully sutured. The intestines are not elsewhere wounded. The mucous membrane is intensely congested. The mucous membrane of the large intestine is deeply pigmented. *Kidneys* are normal in size; they seem to contain fat in the cortices, and are moderately hyperæmic. *Stomach* is normal. *Spleen* is a trifle large, and soft in consistency. *Bladder:* There is a penetrating wound in the roof of the bladder, which is carefully sutured. An incision two inches in length was made in the roof of the organ, to the left of the wound, and showed the bladder to contain about an ounce of mud-colored urine. The organ was then carefully removed, and slit up through the anterior wall, through the prostatic urethra, and an area of half an inch in diameter of intense hyperæmia was seen at the outlet of the right ureter. *Liver* contains very considerable fat and a slight increase of fibrous tissue. *Heart:* Cavities are dilated; the valves are competent. The aortic and mitral valves are moderately thickened.

Microscopic Examination.—Heart: The muscular fibre of the heart is granular; the transverse striæ are very generally obliterated. There are free globules seen in the cell fibre. The interstitial fat is also increased. *Kidneys:* Hyperæmic; some atrophied glomeruli; very slight increase in the fibrous tissue and epithelium in convoluted tubes; granular, and in places fatty. *Liver:* There is considerable fat in the liver, and moderate increase in its fibrous tissue.

Regarding the note by Dr. Ferguson that twelve ounces of fluid were found in the cavity of the abdomen, Dr. Abbe noted two important points: First, it was like peritoneal secretion in severe acute peritonitis, but had a shade of greenish color about it that suggested to him the possibility that he had left some fluid as a cause for part of this, and that it had lurked in the loins, or between the folds of intestine not reached by sponging. Second, the fluid was found in the lumbar region of the abdomen at the autopsy, and his sponging certainly swept into this section before closing the abdomen.

The bullet was lodged in the bladder, and was not discovered by using soft catheters. The point of impact on the posterior bladder wall was bruised but not lacerated.

Dr. Abbe then exhibited some specimens of the parts, to elucidate more fully the nature of the wounds.

DR. JOSEPH C. HUTCHISON remarked that some years ago, while attending a meeting in New Orleans, a case was reported in which the number of intestinal wounds was astonishing, but complete recovery occurred; he could not remember the exact number of the wounds, they were gunshot wounds; he presumed Dr. Bull had not heard of the case from his report.

DR. BULL replied that he had not. From Dr. Abbe's statements, he inferred that the urine will generally be bloody if the bladder has been wounded, and yet, in one case quoted, although clear urine was drawn from the bladder, at the post-mortem an ounce of bloody urine was found in the bladder.

DR. ABBE said that after the operation the patient suffered from suppression, and congestion of the kidneys would account for the two tablespoonfuls of muddy urine found post-mortem.

DR. BULL asked whether it would not be advisable to leave a catheter in the bladder, in order to drain it thoroughly.

DR. ABBE replied that Dr. McBurney and himself were perfectly satisfied that the wound did not penetrate the bladder, and thought there was no necessity.

DR. LANGE then exhibited specimens from a case of

FIBROMYOMATA OF THE UTERUS; SUPRAVAGINAL AMPUTATION; RECOVERY.

The specimen was removed, about four months ago, from a lady thirty-five years of age, who, for a number of years, without success, had tried the usual remedies. The tumor consisted of two main portions. The larger one, about the size of a man's head, had a pedunculated insertion on the upper part of the uterus. It had first to be cut away above, and an elastic ligature applied in order to allow of access to the smaller portion, which was about the size of the two fists and presented a broad insertion in front and to the right of the uterus, having developed below the peritoneum.

For his way of operating he had this time adopted the method of Martin and Schröder of treating the pedicle. The elastic ligature was definitely removed after sewing up the stump by catgut and silk sutures. The operation lasted more than three hours, and the patient finally made a good recovery after some disagreeable and critical disturbances.

Almost immediately after the operation she suffered from an acute nephritis, for which Dr. Lange could assign no cause. An enormous number of casts appeared in the urine, but in about a week it was normal; it had been examined before the operation repeatedly, and had never shown any abnormality. Iodoform had been left in very small quantities in the abdominal cavity. Dr. Lange thought it probable that the protracted ether-narcosis had some relation with this renal affection.

The stump of the uterus did not heal by first intention, though there was not any evidence of secondary hemorrhage. Suppuration and partial peritonitis set in, and an abscess opened itself through the os externus of the uterus. Several silk sutures were discharged or extracted, also some catgut sutures, which had not been absorbed, together with some sloughy tissue. The patient is now in good health and perfectly well. She also had an umbilical hernia before the laparotomy, which was at the same time cured by peritoneal suture. Dr. Lange called special attention to the condition of the right Fallopian tube. It was so much dilated that it almost looked like a filled gut, and when he cut across it after double ligation, and saw its greenish mucous contents, for a moment he thought that he had cut across the gut, the field of operation being so inaccessible in consequence of numerous adhesions.

DR. LANGE also reported two cases of

SUBSEROUS PAPILLARY CYSTOMATA OF THE OVARY, WITH OVARIOTOMY, FOLLOWED BY RECOVERY.

Both of these cases had this in common, that the tumors were of moderate size, situated on the right side, and rested with broad base between the layer of the broad ligament covered by peritoneum, without in any way showing the formation of a pedicle.

In both, the internal surface of the sac showed papillary formations; which in one case were very numerous and well developed, so that in some parts they gave to a large extent to the inner surface a papillary aspect. Both cases were operated on in such a way that the tumor was gradually shelled out of its peritoneal covering under due consideration of preventing hemorrhage by mass ligatures. In one case the peritoneum was thin and could be only incompletely preserved. In the other it was fastened to the lower part of the abdominal wound and the parietal peritoneum in such a way that the peritoneal cavity was entirely shut off. In the other this peritoneal partition was incomplete. In both cases the wound surface in the depth of the peritoneum was filled loosely with iodoform gauze, which was removed on the second or third day, to be replaced by less gauze, and finally by a drainage tube. In this way gradual diminution of the cavity took place, but in one of the cases where the closure had been imperfect, a fistula has remained, through which, so far, some coarse silk sutures have been discharged and more are expected to come out. The patients move about without much discomfort. The specimen of this latter case presents the rare variety of tubo-ovarian cyst, the Fallopian tube being in free communication with the inside of the cystic sac. Its canal was found dilated, the mucous membrane hypertrophied, and the contents a bloody mucus. The contents of the cyst itself at a puncture several months previous to the radical operation were clear, yellowish, thin, containing a great deal of cholesterine crystals.

The other case had the following interesting history: The patient, after having recovered from the operation sufficiently, went to the Catskill Mountains, suffering from unmistakable tuberculosis of the lungs. About four months after the operation I was called to see her, in consultation with Dr. Chubb, of Palenville. Three days previous the symptoms of obstruction of the intestine had suddenly developed, apparently after an indigestion. When I saw her the obstruction was complete, and stercoraceous vomiting had occurred repeatedly. Without much delay I brought the patient to New York, and after having tried, without success, the stomach pump and carbonic acid enemata, I performed laparotomy on the evening of September 17th. The obstruction was due to constriction of a loop of intestine about the size of a duck's egg, by a sharp peritoneal band, which spread between two points near the attachment of the mesentery to the small intestine. Under this band a coil of intestine had apparently slipped, and was so tightly strangulated that it looked almost gangrenous; around it there was a small gathering of brownish, bloody fluid, just as we find it in cases of strangulated hernia. There was no connection with the original field of operation. The peritoneal sac remaining after the ovariotomy, had shrunk to a small, hard lump; some adhesions of the omentum to it were removed. Numerous tubercles were found to be spread over the peritoneum, also one large, cheesy nodule within the omentum.

No disturbance followed the operation from the side of the abdominal cavity. The function of the gut returned in four or five days after the operation, and has, since then, remained normal.

During the second week, however, the lung trouble became more serious, and the formation of a cavity in the right upper lobe of the lung could be clearly made out. The present condition of the patient now, four weeks after the operation, is tolerably good, though there is no doubt that finally she will die from tuberculosis.

DR. BULL asked whether he understood aright, that the iodoform tampon was used in the three cases; and to what extent the abdominal wound was left open.

DR. LANGE replied that the application of the iodoform gauze was different in each case; in one, the wound was left open at the upper portion; in another, the wound was left open below for about two inches; in still another, the peritoneum was sutured, and formed a sort of pouch of the wound, and the gauze simply laid in; removing it on the third day, and replacing new dressing as long as secretions remain, using the long forceps for this purpose. Contraction of the cavity gradually occurs until the wound is entirely healed. In one of these cases there yet remains a fistulous opening, which he thought would soon close.

DR. BRIDDON asked whether it is not common in those cases in which high temperature ensues, to meet with nephritis.

DR. LANGE replied that he thought, perhaps, it was.

DR. BRIDDON remarked that he had frequently found it so, but it all passed off in a few days.

DR. LANGE, in conclusion, stated that there was no septic condition in any of the cases.

CORRESPONDENCE.

NOTE ON PRIORITY AS TO REMOVAL OF THE UTERINE APPENDAGES FOR BLEEDING MYOMA.

To the Editor of THE MEDICAL NEWS,

SIR: In your issue of the 24th of April last I have noted a communication from Mr. Lawson Tait, of Birmingham, England, upon the "Removal of the Uterine Appendages," in which he criticises a paper by his esteemed friend Dr. G. Taber Johnson, of Washington. With this controversy I have nothing to do, but would here state that removal of the appendages does not invariably induce the menopause. I reported a case, last year, where the menses have continued with the utmost regularity and in normal amount for the past eighteen months. In this case, a careful search was made for any supernumerary ovaries, and the tubes and ovaries were exhibited before the Medico-Chirurgical Society at the time.

There is, however, under the second head of his summary, a statement which needs attention, and should not have found its place there without a full and explicit explanation. I allude to his, Mr. Lawson Tait's, there claiming that the "Removal of the uterine appendages for uterine myoma . . . was first performed by me [Mr. Tait] on August 1, 1872, with a successful result. I

am, therefore, entitled to have the operation described by my name."

Now, there are several facts which lead to the conclusion that the priority for this operation heretofore accorded to me seems to be just, which have been overlooked by Mr. Lawson Tait.

1st. In the second volume of the *Gynecological Transactions* for 1876, page 297, I there stated that "I would add to Dr. Battey's four concluding propositions a *fifth*, to the effect that the operation is indicated when severe and exhausting hemorrhages occurred at the menstrual period, which have resisted all forms of treatment. I have published two cases in which I removed the ovaries under these conditions for the purpose of arresting the excessive hemorrhages."

This claim of priority is conceded to me by Drs. Emmet, Goodell, Englemann, and all other writers upon the subject.

In 1884 the meeting of the Canada Medical Association was held in Montreal. Mr. Tait was at the meetings, and *present* when the ablation of the uterine appendages was discussed, and *my claim to priority was asserted without question upon his part.* Now, however, after fourteen years' silence, this gentleman makes known an unsupported and unauthenticated case, claims priority for the operation, and that his name should be connected with it.

These facts are offered to the profession for their judgment, and one can rest assured that their verdict will be in accordance with truth and justice.

E. H. TRENHOLME, M.D.

1402 ST. CATHARINE STREET, MONTREAL,
October 19, 1886.

NEWS ITEMS.

MRS. WOERISHOFFER'S GIFT TO THE NEW YORK ACADEMY OF MEDICINE.—The following correspondence in relation to the munificent gift of Mrs. Woerishoffer, will be read with interest:

NEW YORK, October 13, 1886.

DR. A. JACOBI,

DEAR SIR: Please find enclosed a check for the "Academy of Medicine," which I send you in memory of my husband, the late C. F. Woerishoffer. In selecting the Academy of Medicine as one of the institutions to which I intend to distribute a certain sum in accordance with the wishes of my husband, I am led by the high appreciation Mr. Woerishoffer always entertained for the medical profession.

Yours very sincerely,
ANNA WOERISHOFFER.

NEW YORK, October 15, 1886.

DR. EVERETT HERRICK,
Chairman Board of Trustees New York Academy of Medicine.

SIR: In presenting a munificent donation to the New York Academy of Medicine, Mrs. Anna Woerishoffer was guided, firstly, by the great respect her late husband, Mr. Charles F. Woerishoffer, always felt and expressed for medical science and the medical profession, and secondly, by her conviction that it is better to aid and sustain such institutions of either science or charity as have already proved their faculty and right to exist by duration, results, and accumulated property, than to create new institutions.

After mature deliberation she came to the conclusion that the New York Academy of Medicine has, by its publications in the journals of the country, and in numerous volumes of transactions and bulletins, and by its regular, stated, and section meetings, largely contributed to the progress of medical science, and deserves eminently the name of a scientific body; that after having existed forty years, collected an ever increasing library, and accumulated considerable property, the New York Academy of Medicine holds out the promise of perpetuity; that, by excluding politics and ethical strifes from its constitution and gatherings, it deserves the name of a purely and exclusively scientific body, and thereby the confidence of the public; and that it must necessarily become and be the centre of the scientific interests and labors of the medical profession of New York.

Mrs. Woerishoffer was also struck with the fact that the present building of the New York Academy is too small for its present and future purposes; that not only its sections require more accommodations, but that every medical and scientific society of the city ought to find ample room within its walls, and look upon the Academy as its proper centre; and finally, that the increasing library is in urgent need of a fire-proof building.

From these points of view, Mrs. Woerishoffer desires to contribute to the means required for enabling the New York Academy of Medicine to accomplish its great ends, and reach its high aims, which she takes to be both truly scientific and truly humane.

I have the honor, Mr. Chairman, of enclosing Mrs. Woerishoffer's letter and her check for twenty-five thousand dollars.

Very respectfully yours,
A. JACOBI. M.D.,
President.

NEW YORK, October 16, 1886.

MRS. ANNA WOERISHOFFER,

DEAR MADAME: The Trustees of the New York Academy of Medicine gratefully acknowledge the receipt of your check, through Dr. Jacobi, for twenty-five thousand dollars, sent in memory of your husband, the late Mr. C. F. Woerishoffer, and in accordance with his wishes.

In accepting the gift, the Trustees desire to thank you as the almoner of your husband's estate, and hope so to use it that no one bearing his name shall have cause to regret "the high appreciation which Mr. Woerishoffer always entertained for the medical profession."

Yours very truly,
EVERETT HERRICK, M.D.,
President.

GEORGE A. PETERS, M.D.,
Secretary.

NEW YORK, October 22, 1886.

MRS. ANNA WOERISHOFFER,

DEAR MADAME: At a meeting of the Academy held Thursday evening, October 21, 1886, the following resolutions, moved by Fordyce Barker, M.D., and seconded by C. R. Agnew, M.D., were unanimously adopted:

Resolved, That the New York Academy of Medicine accept with the warmest thanks and gratitude, the noble gift of twenty-five thousand dollars from Mrs. Anna Woerishoffer, as an expression of the appreciation by her late husband, Mr. Charles F. Woerishoffer, and her-

self, of the importance of the medical profession to the health and welfare of the public, as well as to individuals, and the necessity for the development of its highest culture.

Resolved, That the names of Mr. and Mrs. Charles F. Woerishoffer be inscribed in the Academy for permanent record as Benefactors.

Resolved, That a copy of these resolutions, duly engrossed, and signed by the President, Recording Secretary, and Treasurer, be transmitted to Mrs. Woerishoffer.

A. JACOBI, M.D.,
President.
A. M. JACOBUS, M.D.,
Recording Secretary.
F. A. CASTLE, M.D.,
Treasurer.

LOW WATER IN WELLS AND TYPHOID FEVER.—Dr. Henry B. Baker, of Lansing, Michigan, supposes a close relation to exist between typhoid fever and low water in wells. The diagrams which he presents in his paper of the prevalence of sickness from typhoid fever in Michigan, and the depth of the earth above the ground-water in the wells during six successive years, seem to show that, beginning with June in each year, the sickness-curve follows more or less closely the well water-curve. The author believes that one of the causes, probably the principal cause, of sickness, is the contamination of the water by the drainage from stableyards, privy-vaults, and cesspools, which reaches the wells more directly when the water in them is low, and forms in them stronger solutions than when it is high. On the other hand, the curves in several years, from January to June, show no such correspondence. The difference in results is explained by the frozen condition of the ground in the winters when typhoid did not prevail; a condition which, while it tended to reduce the quantity of water in the wells, at the same time prevented percolation from the surface sources of contamination. The fever was more prevalent in the open winters when percolation was not thus impeded. Corroboration is given to these views by a remark made by Dr. Foster Pratt, of Kalamazoo, at the meeting of the American Medical Association in June, 1874, that typhoid fever was unusually prevalent in Kalamazoo in a certain year in the autumn, at about the time the water in the wells was very low, and some wells became dry.

CHANGES IN TOOTH-FORM.—Professor Windle has announced to the British Association, as conclusions from his researches on the subject, that man's original dentition included six incisors in either jaw; that two from each jaw have gradually disappeared; that this loss is due to the contraction of the anterior part of the palate; that this process of contraction will probably go on and result in the loss of two further incisors; and that the conical shape of many of the supernumerary teeth indicates a reversion to the primitive type of tooth.

A NEW MANIFESTATION OF ARGYRIA.—M. LEWIN has reported to the Berlin Medical Society his observation of an affection that seems to be peculiar to workers in silver. It appears in the form of round or oval bluish spots on the skin, which in extreme cases may be as large as a nickel five-cent piece, generally on the back of the left hand. Workmen in metals who do not use silver are free from it. The manner in which the spots are produced is not clear, for experiments with the direct application of silver in various forms have failed to generate them. The silver probably falls upon some scratch—for the spots are usually developed where there has been a lesion—in a solution, and afterward undergoes some chemical change by the action of the bodily fluids which induces this peculiar color.

ABSENCE OF ALKALOIDS IN HOT-HOUSE PLANTS.—According to Prof. A. Vogel, plants do not always contain their characteristic alkaloids when grown under other than natural conditions. Hemlock does not yield coniine in Scotland, and cinchona plants are nearly free from quinine when grown in hot-houses. Tannin is found in the greatest quantity in trees which have had a full supply of direct sunlight.

NOTES AND QUERIES.

COCAINE ADDICTION.

To the Editor of THE MEDICAL NEWS.

If any reader of your journal has met with a case of cocaine addiction, and will send me the fullest details at his command, I'll thank him for the courtesy, reimburse him for any expense incurred, and give him full credit in a forthcoming paper.

J. B. MATTISON, M.D.

314 STATE STREET, BROOKLYN.

OFFICIAL LIST OF CHANGES IN THE MEDICAL CORPS OF THE U. S. NAVY FOR THE WEEK ENDING OCTOBER 30, 1886.

DIEHL, OLIVER, *Passed Assistant Surgeon U. S. N.*—Granted three months leave of absence from October 26, 1886.

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF OFFICERS SERVING IN THE MEDICAL DEPARTMENT, U. S. ARMY, FROM OCTOBER 26 TO NOVEMBER 1, 1886.

MIDDLETON, J. V. D., *Major and Surgeon.*—Ordered from the Department of Missouri to David's Island, N. Y. H.—*S. O. 252, A. G. O.*, October 29, 1886.

WOODHULL, A. A., *Major and Surgeon.*—Ordered from David's Island, N. Y. H. to the Department, of Missouri.—*S. O. 252, A. G. O.*, October 29, 1886.

WILLIAMS, J. W., *Major and Surgeon.*—Ordered fom the Department of Colorado to the Department of the East—*S. O. 252, A. G. O.*, October 29, 1886.

CARSON, J. K., *Captain and Assistant Surgeon.*—Ordered from Jefferson Barracks, Missouri, to the Department of Colorado, upon expiration of present leave of absence.—*S. O. 252, A. G. O.*, October 29, 1886.

TURRILL, H. S., *Captain and Assistant Surgeon.*—Ordered from the Department of the Platte to the Department of Colorado.—*S. O. 252, A. G. O.*, October 29, 1886.

MUNDAY, BENJ., *First Lieutenant and Assistant Surgeon.*—Ordered from the Department of Colorado to Jefferson Barracks, Missouri—*S. O. 252, A. G. O.*, October 29, 1886.

LAUDERDALE, JOHN V., *Captain and Assistant Surgeon.*—Leave of absence extended one month—*S. O. 249, A. G. O.*, October 29, 1886.

OWEN, WM. O., JR., *First Lieutenant and Assistant Surgeon.*—Relieved from duty at Fort Schuyler, N. Y. H., and ordered for duty as post-surgeon at Plattsburg Barracks, N. Y.—*S. O. 170, Division of the Atlantic*, October 29, 1886.

EDIE, GUY L., *First Lieutenant and Assistant Surgeon.*—Ordered from Fort McIntosh, Texas, to Post of San Antonio, Texas.—*S. O. 152, Department of Texas*, October 27, 1886.

HARRIS, H. S. T., *First Lieutenant and Assistant Surgeon.*—Ordered from Post of San Antonio, Texas, to Fort Clark, Texas.—*S. O. 152, Department of Texas*, October 27, 1886.